



Objective  
**BIOLOGY** for  
**NEET**

NATIONAL ELIGIBILITY CUM ENTRANCE TEST

Includes  
**NEET 2018**  
Solved  
Paper



### HIGHLIGHTS

- Structured as per NCERT curriculum
- 2 Sample Papers, 3 Mock Tests and Solved Previous Years' Papers for Practice
- 2500+ MCQs included chapter-wise

Vol  
II



RAJIV VIJAY

# About Pearson

---

*Pearson is the world's learning company, with presence across 70 countries worldwide. Our unique insights and world-class expertise comes from a long history of working closely with renowned teachers, authors and thought leaders, as a result of which, we have emerged as the preferred choice for millions of teachers and learners across the world.*

*We believe learning opens up opportunities, creates fulfilling careers and hence better lives. We hence collaborate with the best of minds to deliver you class-leading products, spread across the Higher Education and K12 spectrum.*

*Superior learning experience and improved outcomes are at the heart of everything we do. This product is the result of one such effort.*

*Your feedback plays a critical role in the evolution of our products and you can contact us - [reachus@pearson.com](mailto:reachus@pearson.com). We look forward to it.*

*This page is intentionally left blank.*

**OBJECTIVE BIOLOGY**

*for*

**NEET**

**(National Eligibility Cum Entrance Test)**

**and Other Medical  
Entrance Examinations**

**Volume II**

**Third Edition**

**Dr Rajiv Vijay, MBBS**

*Government Medical College, Kota*

**Copyright © 2019 Pearson India Education Services Pvt. Ltd**

Published by Pearson India Education Services Pvt. Ltd, CIN: U72200TN2005PTC057128.

No part of this eBook may be used or reproduced in any manner whatsoever without the publisher's prior written consent.

This eBook may or may not include all assets that were part of the print version. The publisher reserves the right to remove any material in this eBook at any time.

ISBN 978-93-530-6225-5

eISBN 9789353066055

**First Impression**

Head Office: 15th Floor, Tower-B, World Trade Tower, Plot No. 1, Block-C, Sector 16, Noida 201 301, Uttar Pradesh, India.

Registered Office: 4th Floor, Software Block, Elnet Software City, TS 140, Block 2 & 9, Rajiv Gandhi Salai, Taramani, Chennai 600 113, Tamil Nadu, India.

Fax: 080-30461003, Phone: 080-30461060 [www.pearson.co.in](http://www.pearson.co.in),

Email id: [companysecretary.india@pearson.com](mailto:companysecretary.india@pearson.com)

# Contents

|  |      |
|--|------|
| <i>Preface</i>                                       | vii  |
| <i>Acknowledgments</i>                               | viii |
| <i>About the Author</i>                              | viii |
| <i>Trend Analysis of NEET Biology From 2010–2018</i> | ix   |
| <i>NEET Biology 2018</i>                             | xi   |
| <i>NEET Biology 2017</i>                             | xxv  |

## Volume 1

|                 |  |            |
|-----------------|--|------------|
| <b>Unit I</b>   | <b>Diversity in the Living World</b>                 |            |
|                 | 1. Living World                                      | 1.3–1.16   |
|                 | 2. Biological Classification                         | 2.1–2.22   |
|                 | 3. Plant Kingdom                                     | 3.1–3.30   |
|                 | 4. Animal Classification                             | 4.1–4.32   |
| <b>Unit II</b>  | <b>Structural Organization in Plants and Animals</b> |            |
|                 | 5. Plant Morphology                                  | 5.3–5.26   |
|                 | 6. Anatomy of Flowering Plants                       | 6.1–6.24   |
|                 | 7. Structural Organization in Animals                | 7.1–7.18   |
| <b>Unit III</b> | <b>Cell: Structures and Functions</b>                |            |
|                 | 8. Cell: The Unit of Life                            | 8.3–8.30   |
|                 | 9. Biomolecules                                      | 9.1–9.26   |
|                 | 10. Cell Cycle and Cell Division                     | 10.1–10.20 |
| <b>Unit IV</b>  | <b>Plant Physiology</b>                              |            |
|                 | 11. Transport in Plants                              | 11.3–11.24 |
|                 | 12. Mineral Nutrition                                | 12.1–12.18 |
|                 | 13. Photosynthesis in Higher Plants                  | 13.1–13.22 |
|                 | 14. Respiration in Plants                            | 14.1–14.14 |
|                 | 15. Plant Growth and Development                     | 15.1–15.22 |
| <b>Unit V</b>   | <b>Human Physiology</b>                              |            |
|                 | 16. Digestion and Absorption                         | 16.3–16.22 |
|                 | 17. Breathing and Exchange of Gases                  | 17.1–17.22 |

|  |            |
|--|------------|
| 18. Body Fluids and Circulation              | 18.1–18.26 |
| 19. Excretory Products and Their Elimination | 19.1–19.28 |
| 20. Locomotion and Movement                  | 20.1–20.22 |
| 21. Neural Control and Co-ordination         | 21.1–21.22 |
| 22. Chemical Co-ordination and Integration   | 22.1–22.22 |

## Volume 2

|                 |  |                   |
|-----------------|--|-------------------|
| <b>Unit I</b>   | <b>Reproduction</b>                              |                   |
|                 | 1. Reproduction in Organisms                     | 1.3–1.24          |
|                 | 2. Sexual Reproduction in Flowering Plant        | 2.1–2.38          |
|                 | 3. Human Reproduction                            | 3.1–3.34          |
|                 | 4. Reproductive Health                           | 4.1–4.16          |
| <b>Unit II</b>  | <b>Genetics and Evolution</b>                    |                   |
|                 | 5. Principles of Inheritance and Variation       | 5.3–5.42          |
|                 | 6. Molecular Basis of Inheritance                | 6.1–6.32          |
|                 | 7. Evolution                                     | 7.1–7.32          |
| <b>Unit III</b> | <b>Biology in Human Welfare</b>                  |                   |
|                 | 8. Human Health and Disease                      | 8.3–8.34          |
|                 | 9. Strategies for Enhancement in Food Production | 9.1–9.18          |
|                 | 10. Microbes in Human Welfare                    | 10.1–10.22        |
| <b>Unit IV</b>  | <b>Biotechnology</b>                             |                   |
|                 | 11. Biotechnology Principles and Processes       | 11.3–11.24        |
|                 | 12. Biotechnology and Its Application            | 12.1–12.18        |
| <b>Unit V</b>   | <b>Ecology</b>                                   |                   |
|                 | 13. Organisms and Populations                    | 13.3–13.30        |
|                 | 14. Ecosystem                                    | 14.1–14.22        |
|                 | 15. Biodiversity and Conservation                | 15.1–15.18        |
|                 | 16. Environmental Issues                         | 16.1–16.20        |
|                 | <i>Mock Test 1</i>                               | <i>M1.1–M1.6</i>  |
|                 | <i>Mock Test 2</i>                               | <i>M2.1–M2.10</i> |
|                 | <i>Mock Test 3</i>                               | <i>M3.1–M3.8</i>  |
|                 | <i>Sample Paper-I</i>                            | <i>S1.1–S1.8</i>  |
|                 | <i>Sample Paper-II</i>                           | <i>S2.1–S2.8</i>  |
|                 | <i>Sample Paper-III</i>                          | <i>S3.1–S3.8</i>  |

# Preface

---

*Objective Biology for NEET and other Medical Entrance Examinations* is a comprehensive practice material for students aspiring to get admission into prestigious medical colleges. The contents of this book have been carefully drafted to help students master the latest trends in questions from across key medical entrance examinations. This book can also be used as a resource to prepare for class XI and XII board examinations—based on NCERT.

Highlights of the book:

- Structured as per class XI and XII syllabus of NCERT.
- Content designed to help maximise scores.
- Assertion and Reason questions to aid in preparing for AIIMS and similar exams.
- Previous years question embedded in every chapter.
- Includes latest NEET solved paper for practice.
- Mock tests and sample papers for student's self-practice.

Students Note:

As an experienced teacher, I would suggest that before starting any chapter of this book, a student should meticulously scan the theory and diagrams of the NCERT Textbook and complete minimum three rounds of reading of its chapters. In my opinion, the book will prove to be an asset and will serve to fulfill the requirement of the medical aspirants.

**Rajiv Vijay**



# Acknowledgments

---

This book is a result of the enormous effort and support given by my team members who were always there to support me. I believe that the blessings of my parents (Late Gopallal Vijay and Late Suryakanta Vijay) and my grandparents have always played a prime role in making me more focused and determined towards my goal. My wife Shubha Vijay, brother Jeetu Vijay and all other family members inspired me throughout the preparation of this book.

My sincere thanks to the team of Pearson Education for providing me the platform to serve students and I appreciate their efforts in bringing out this book in such an excellent manner.

Careful attempts have been made in making the book error free; however, corrections, suggestions, queries, and criticism will be highly appreciated and are welcome.

Once again special thanks to my wife Shubha Vijay for always being there with me and helping me in ensuring high quality throughout the book.

**Rajiv Vijay**

# About the Author

---

Dr Rajiv Vijay has completed his schooling from JNV HURDA, Bhilwara, Rajasthan and qualified for MBBS through PMT in 1997. After completing MBBS in 2003 from Government Medical College, Kota, he established his Medical and Engineering Entrance Coaching Institute in Vadodara (Gujarat) which is today known as RJ VISION Pvt. Ltd.

In his career of 16 years, he has taught a lot of students and most of them are extremely successful in various reputed pre-medical entrance examinations. In 2011, he was selected as the head of the pre-medical division of Resonance, Kota. As the head of pre-medical division and HOD of biology he nurtured, developed, installed and supervised the pre-medical division at Kota and all centers across India.

Many of his students have secured excellent ranks in different types of medical entrance examinations in India and have enrolled in prestigious medical colleges like AIIMS, SMS Jaipur, KEM Mumbai, AFMC Pune and JIPMER Puducherry, etc. The author also mentors his students through free video lectures in his youtube page, [www.youtube.com/c/drrajiv\\_vijay](http://www.youtube.com/c/drrajiv_vijay).

# Trend Analysis 2007–2018

---

| Ch. No | Chapter Name                             | Number of Question(s) in |      |      |      |      |      |      |      |      |
|--------|--|--------------------------|------|------|------|------|------|------|------|------|
|        |  | 2010                     | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| 1      | The Living World                         | 0                        | 1    | 0    | 1    | 0    | 0    | 1    | 1    |      |
| 2      | Biological Classification                | 3                        | 8    | 4    | 1    | 6    | 2    | 5    | 4    |      |
| 3      | Plant Kingdom                            | 3                        | 1    | 3    | 4    | 4    | 4    | 2    | 3    |      |
| 4      | Animal Kingdom                           | 4                        | 3    | 1    | 4    | 4    | 3    | 3    | 3    |      |
| 5      | Morphology of Flowering Plants           | 3                        | 4    | 4    | 2    | 5    | 5    | 5    | 4    |      |
| 6      | Anatomy of Flowering Plants              | 3                        | 4    | 5    | 3    | 2    | 4    | 1    | 2    |      |
| 7      | Structural Organisations in Animals      | 1                        | 3    | 2    | 1    | 2    | 2    | 2    | 2    |      |
| 8      | Cell: The Unit of Life                   | 4                        | 4    | 5    | 3    | 4    | 4    | 5    | 4    |      |
| 9      | Biomolecules                             | 1                        | 2    | 3    | 4    | 2    | 1    | 3    | 4    |      |
| 10     | Cell Cycle and Cell Division             | 2                        | 1    | 2    | 2    | 3    | 2    | 3    | 2    |      |
| 11     | Transport in Plants                      | 0                        | 0    | 0    | 1    | 0    | 1    | 2    | 0    |      |
| 12     | Mineral Nutrition                        | 3                        | 4    | 3    | 1    | 1    | 2    | 1    | 2    |      |
| 13     | Photosynthesis                           | 3                        | 2    | 2    | 1    | 1    | 2    | 3    | 2    |      |
| 14     | Respiration in Plants                    | 1                        | 0    | 0    | 2    | 1    | 0    | 0    | 1    |      |
| 15     | Plant Growth and Development             | 2                        | 0    | 0    | 2    | 4    | 2    | 1    | 2    |      |
| 16     | Digestion and Absorption                 | 2                        | 2    | 1    | 1    | 2    | 2    | 2    | 1    |      |
| 17     | Breathing and Exchange of Gases          | 2                        | 0    | 1    | 2    | 1    | 2    | 2    | 2    |      |
| 18     | Body Fluids and Circulation              | 3                        | 5    | 0    | 1    | 2    | 3    | 1    | 2    |      |
| 19     | Excretory Products and their Elimination | 3                        | 5    | 1    | 1    | 1    | 2    | 1    | 3    |      |
| 20     | Locomotion and Movement                  | 0                        | 0    | 1    | 3    | 1    | 2    | 1    | 3    |      |
| 21     | Neural Control and Coordination          | 1                        | 2    | 3    | 2    | 3    | 2    | 1    | 2    |      |
| 22     | Chemical Coordination and Regulation     | 4                        | 2    | 3    | 3    | 2    | 1    | 3    | 2    |      |
| 23     | Reproduction in Organisms                | 0                        | 1    | 1    | 3    | 0    | 0    | 1    | 2    |      |
| 24     | Sexual Reproduction in Flowering Plants  | 4                        | 5    | 3    | 6    | 3    | 4    | 5    | 3    |      |



# National Eligibility Cum Entrance Test: Biology 2018

---

## Plant Kingdom

1. Which of the following statements is correct?
  - (a) Ovules are not enclosed by ovary wall in gymnosperms
  - (b) Horsetails are gymnosperms
  - (c) *Selaginella* is heterosporous, while *Salvinia* is homosporous
  - (d) Stems are usually unbranched in both *Cycas* and *Cedrus*.

## Morphology of Flowering Plants

2. Pneumatophores occur in
  - (a) Halophytes
  - (b) Carnivorous plants
  - (c) Free-floating hydrophytes
  - (d) Submerged hydrophytes

## Morphology of Flowering Plants

3. Sweet potato is a modified
  - (a) Stem
  - (b) Tap root
  - (c) Adventitious root
  - (d) Rhizome

## Anatomy of Flowering Plants

4. Plants having little or no secondary growth are
  - (a) Grasses
  - (b) Conifers
  - (c) Deciduous angiosperms
  - (d) Cycads

## Anatomy of Flowering Plants

5. Casparian strips occur in
  - (a) Epidermis
  - (b) Cortex
  - (c) Pericycle
  - (d) Endodermis

## Anatomy of Flowering Plants

6. Secondary xylem and phloem in dicot stem are produced by
  - (a) Apical meristems
  - (b) Phellogen
  - (c) Vascular cambium
  - (d) Axillary meristem

## Biological Classification

7. Select the wrong statement
  - (a) Cell wall is present in members of Fungi and Plantae.
  - (b) Pseudopodia are locomotory and feeding structures in Sporozoans.
  - (c) Mushrooms belong to Basidiomycetes.
  - (d) Mitochondria are the powerhouse of the cell in all kingdoms except Monera.

**Molecular Basis of Inheritance**

8. The experimental proof for semiconservative replication of DNA was first shown in a
- |               |           |
|---------------|-----------|
| (a) Fungus    | (b) Plant |
| (c) Bacterium | (d) Virus |

**Molecular Basis of Inheritance**

9. Select the correct match:
- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| (a) Alec Jeffreys                    | - <i>Streptococcus pneumoniae</i> |
| (b) Matthew Meselson and F. Stahl    | - <i>Pisum sativum</i>            |
| (c) Alfred Hershey and Martha Chase  | - TMV                             |
| (d) Francois Jacob and Jacques Monod | - <i>Lac operon</i>               |

**Principle of Inheritance and Variation**

10. Select the correct statement
- Franklin Stahl coined the term “linkage”
  - Spliceosomes take part in translation
  - Punnett square was developed by a British scientist
  - Transduction was discovered by S. Altman

**Principle of Inheritance and Variation**

11. Which of the following pairs is wrongly matched?
- |                                |   |                  |
|--------------------------------|---|------------------|
| (a) Starch synthesis in pea    | : | Multiple alleles |
| (b) XO types sex determination | : | Grasshopper      |
| (c) ABO blood grouping         | : | Co-dominance     |
| (d) T.H. Morgan                | : | Linkage          |

**Reproduction in Organism**

12. Offsets are produced by
- Meiotic divisions
  - Parthenocarpy
  - Mitotic divisions
  - Parthenogenesis

**Reproduction in Organism**

13. Which of the following flowers only once in its life-time?
- |                    |            |
|--------------------|------------|
| (a) Bamboo species | (b) Mango  |
| (c) Jackfruit      | (d) Papaya |

**Sexual Reproduction in Flowering Plants**

14. Which of the following has proved helpful in preserving the pollen as fossils?
- |                       |                   |
|-----------------------|-------------------|
| (a) Pollenkitt        | (b) Oil content   |
| (c) Cellulosic intine | (d) Sporopollenin |

**Bio Technology and its Applications**

15. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes?
- |                |                     |
|----------------|---------------------|
| (a) Retrovirus | (b) $\lambda$ phage |
| (c) Ti plasmid | (d) pBR 322         |

**Bio Technology Principles and Processes**

16. The correct order of steps in Polymerase Chain Reaction (PCR) is
- Extension, Denaturation, Annealing
  - Denaturation, Extension, Annealing
  - Annealing, Extension, Denaturation
  - Denaturation, Annealing, Extension

**Bio Technology and its Applications**

17. In India, the organisation responsible for assessing the safety of introducing genetically modified organisms for public use is
- Indian Council of Medical Research (ICMR)
  - Research committee on Genetic Manipulation (RCGM)
  - Council for scientific and Industrial Research (CSIR)
  - Genetic Engineering Appraisal Committee (GEAC)

**Bio Technology and its Application**

18. Use of bioresources by multinational companies and organisations without authorisation from the concerned country and its people is called
- Bio-infringement
  - Biodegradation
  - Biopiracy
  - Bioexploitation

**Bio Technology and its Applications**

19. A 'new' variety of rice was patented by a foreign company, though such varieties have been present in India for a long time. This is related to
- |                     |                |
|---------------------|----------------|
| (a) Co-667          | (b) Lerma Rojo |
| (c) Sharbati Sonora | (d) Basmati    |

**Biomolecules**

20. Select the correct match:
- |                                   |                  |
|-----------------------------------|------------------|
| (a) Ribozyme                      | - Nucleic acid   |
| (b) T.H. Morgan                   | - Transduction   |
| (c) $F_2 \times$ Recessive parent | - Dihybrid cross |
| (d) G. Mendel                     | - Transformation |

**Bio Diversity and its Conservation**

21. Niche is
- All the biological factors in the organism's environment
  - The range of temperature that the organism needs to live
  - The physical space where an organism lives
  - The functional role played by the organism where it lives

**Environmental Issues**

22. Which of the following is a secondary pollutant?
- |                     |                     |
|---------------------|---------------------|
| (a) CO              | (b) SO <sub>2</sub> |
| (c) CO <sub>2</sub> | (d) O <sub>3</sub>  |

**Environment Issues**

23. World Ozone Day is celebrated on
- (a) 5<sup>th</sup> June (b) 16<sup>th</sup> September  
(c) 21<sup>st</sup> April (d) 22<sup>nd</sup> April

**Organisms and Population**

24. Natality refers to
- (a) Death rate  
(b) Number of individuals leaving the habitat  
(c) Birth rate  
(d) Number of individuals entering a habitat

**Environmental Issues**

25. In stratosphere, which of the following elements acts as a catalyst in degradation of ozone and release of molecular oxygen?
- (a) Carbon (b) Fe  
(c) Cl (d) Oxygen

**Ecosystem**

26. What type of ecological pyramid would be obtained with the following data?
- |                    |   |       |
|--------------------|---|-------|
| Secondary consumer | : | 120 g |
| Primary consumer   | : | 60 g  |
| Primary producer   | : | 10 g  |
- (a) Inverted pyramid of biomass  
(b) Upright pyramid of numbers  
(c) Pyramid of energy  
(d) Upright pyramid of biomass

**Cell the Unit of Life**

27. The Golgi complex participates in
- (a) Fatty acid breakdown  
(b) Respiration in bacteria  
(c) Formation of secretory vesicles  
(d) Activation of amino acid

**Photosynthesis in Higher Plants**

28. Which of the following is not a product of light reaction of photosynthesis?
- (a) ATP  
(b) NADPH  
(c) NADH  
(d) Oxygen

**Biological Classification**

29. Which among the following is not a prokaryote?
- (a) *Saccharomyces*  
(b) *Nostoc*  
(c) *Mycobacterium*  
(d) *Oscillatoria*

**Port in Plants**

30. Stomatal movement is not affect by
- Temperature
  - O<sub>2</sub> concentration
  - Light
  - CO<sub>2</sub> concentration

**Cell the Unit of Life**

31. Which of the following is true for nucleolus?
- Larger nucleoli are present in dividing cells.
  - It takes part in spindle formation.
  - It is a membrane-bound structure.
  - It is a site for active ribosomal RNA synthesis.

**Cell Cycle and Cell Division**

32. The stage during which separation of the paired homologous chromosomes begins is
- |               |                |
|---------------|----------------|
| (a) Pachytene | (b) Diakinesis |
| (c) Diplotene | (d) Zygoten    |

**Biomolecules**

33. The two functional groups characteristic of sugar are
- Hydroxyl and methyl
  - Carbonyl and phosphate
  - Carbonyl and methyl
  - Carbonyl and hydroxyl

**Anatomy of Flowering Plants**

34. Stomoata in grass leaf are
- Dumb-bell shaped
  - Rectangular
  - Kidney shaped
  - Barrel shaped

**Sexual Reproduction in Flowering Plants**

35. Which one of the following plants shows a very close relationship with a species of moth, where none of the two can complete its life cycle without the other?
- |                     |                  |
|---------------------|------------------|
| (a) <i>Hydrilla</i> | (b) Banana       |
| (c) <i>Yucca</i>    | (d) <i>Viola</i> |

**Sexual Reproduction in Flowering Plants**

36. Pollen grains can be stored for several years in liquid nitrogen having a temperature of
- |            |            |
|------------|------------|
| (a) -120°C | (b) -196°C |
| (c) -80°C  | (d) -160°C |

**Sexual Reproduction in Flowering Platns**

37. Double fertilization is
- Fusion of two male gametes of a pollen tube with two different eggs
  - Fusion of two male gametes with one egg
  - Fusion of one male gamete with two polar nuclei
  - Syngamy and triple fusion



**Photosynthesis in Higher Plants**

38. Oxygen is not produced during photosynthesis by
- |                            |                  |
|----------------------------|------------------|
| (a) Green sulphur bacteria | (b) <i>Cycas</i> |
| (c) <i>Nostoc</i>          | (d) <i>Chara</i> |

**Mineral Nutrition**

39. Which of the following elements is responsible for maintaining turgor in cell?
- |               |               |
|---------------|---------------|
| (a) Magnesium | (b) Potassium |
| (c) Sodium    | (d) Calcium   |

**Respiration in Flowering Plants**

40. What is the role of NAD<sup>+</sup> in cellular respiration?
- It functions as an enzyme
  - It is a nucleotide source for ATP synthesis
  - It functions as an electron carrier
  - It is the final electron acceptor for anaerobic respiration

**Mineral Nutrition**

41. In which of the following forms is iron absorbed by plants?
- |             |                             |
|-------------|-----------------------------|
| (a) Ferric  | (b) Free element            |
| (c) Ferrous | (d) Both ferric and ferrous |

**Sexual Reproduction in Flowering Plants**

42. Winged pollen grains are present in
- |                  |                  |
|------------------|------------------|
| (a) Mustard      | (b) Mango        |
| (c) <i>Cycas</i> | (d) <i>Pinus</i> |

**Biological Classification**

43. After karyogamy followed by meiosis, spores are produced exogenously in
- |                       |                          |
|-----------------------|--------------------------|
| (a) <i>Neurospora</i> | (b) <i>Agaricus</i>      |
| (c) <i>Alternaria</i> | (d) <i>Saccharomyces</i> |

**Plant Kingdom**

44. Which one is wrongly matched?
- |                            |                       |
|----------------------------|-----------------------|
| (a) Uniflagellate gametes  | - <i>Polysiphonia</i> |
| (b) Gemma cups             | - <i>Marchantia</i>   |
| (c) Biflagellate zoospores | - Brown algae         |
| (d) Unicellular organism   | - <i>Chlorella</i>    |

**Living World**

45. Matched the items given in Column I with those in Column II and select the correct option given below:

| Column I      | Column II   |
|---------------|---|
| (a) Herbarium | (i) It is a place having a collection of preserved plants and animals.  |
| (b) Key       | (ii) A list that enumerates methodically all the species found in an area with brief description aiding identification. |

|               |  |
|---------------|--|
| (c) Museum    | (iii) Is a place where dried and pressed plant specimens mounted on sheets are kept.                                     |
| (d) Catalogue | (iv) A booklet containing a list of characters and their alternates which are helpful in identification of various taxa. |

**Options:**

- |           |      |       |      |
|-----------|------|-------|------|
| (a)       | (b)  | (c)   | (d)  |
| (a) (i)   | (iv) | (iii) | (ii) |
| (b) (ii)  | (iv) | (iii) | (i)  |
| (c) (iii) | (ii) | (i)   | (iv) |
| (d) (iii) | (iv) | (i)   | (ii) |

**Chemical Coordination and Integration**

46. Which of the following is an amino acid derived hormone?

- |                 |               |
|-----------------|---------------|
| (a) Epinephrine | (b) Estradiol |
| (c) Ecdysone    | (d) Estriol   |

**Neural Control and Coordination**

47. Which of the following structures or regions is incorrectly paired with its function?

- |                       |  |
|-----------------------|--|
| (1) Medulla oblongata | controls respiration and cardiovascular reflexes.  |
| (2) Hypothalamus      | production of releasing hormones and regulation of temperature, hunger and thirst.         |
| (3) Limbic system     | consists of fibre tracts that interconnect different regions of brain; controls movements. |
| (4) Corpus callosum   | band of fibers connecting left and right cerebral hemispheres.                             |

**Neural Control and Coordination**

48. The transparent lens in the human eye is held in its place by

- Ligaments attached to the ciliary body
- Smooth muscles attached to the iris
- Ligaments attached to the iris
- Smooth muscles attached to the ciliary body

**Locomotion and Movement**

49. Which of the following hormones can play a significant role in osteoporosis?

- Aldosterone and Prolactin
- Estrogen and Parathyroid hormone
- Progesterone and Aldosterone
- Parathyroid hormone and Prolactin

**Evolution**

50. Among the following sets of examples for divergent evolution, select the incorrect option:

- Forelimbs of man, bat and cheetah
- Brain of bat, man and cheetah
- Heart of bat, man and cheetah
- Eye of octopus, bat and man



**Environmental Issues**

58. Match the items given in Column I with those in Column II and select the correct option given below:

| Column I              | Column II                 |
|-----------------------|---------------------------|
| (a) Eutrophication    | (i) UV-B radiation        |
| (b) Sanitary landfill | (ii) Deforestation        |
| (c) Snow blindness    | (iii) Nutrient enrichment |
| (d) Jhum cultivation  | (iv) Waste disposal       |

**Options:**

- |           |       |       |       |
|-----------|-------|-------|-------|
| (a)       | (b)   | (c)   | (d)   |
| (a) (ii)  | (i)   | (iii) | (iv)  |
| (b) (iii) | (iv)  | (i)   | (ii)  |
| (c) (i)   | (iii) | (iv)  | (ii)  |
| (d) (i)   | (ii)  | (iv)  | (iii) |

**Organisms and Population**

59. In a growing population of a country,
- Pre-reproductive individuals are more than the reproductive individuals.
  - Reproductive and pre-reproductive individuals are equal in number.
  - Reproductive individuals are less than the post-reproductive individuals.
  - Pre-reproductive individuals are less than the reproductive individuals.

**Human Health and Diseases**

60. Which part of poppy plant is used to obtain the drug "Smack"?
- |             |            |
|-------------|------------|
| (a) Flowers | (b) Roots  |
| (c) Latex   | (d) Leaves |

**Human Reproduction**

61. Hormones secreted by the placenta to maintain pregnancy are
- hCG, hPL, progesterones, prolactin
  - hCG, hPL, progesterones, estrogens
  - hCG, hPL, estrogens, relaxin, oxytocin
  - hCG, progesterones, estrogens, glucocorticoids

**Reproductive Health**

62. The contraceptive 'SAHELI'
- Blocks estrogen receptors in the uterus, preventing eggs from getting implanted.
  - Is an IUD
  - Increases the concentration of estrogen and prevents ovulation in females.
  - Is a post-coital contraceptive.

**Human Reproduction**

63. The amnion of mammalian embryo is derived from
- Ectoderm and mesoderm
  - Mesoderm and trophoblast
  - Endoderm and mesoderm
  - Ectoderm and endoderm

### Human Reproduction

64. The difference between spermiogenesis and spermiation is
- In spermiogenesis spermatids are formed, while in spermiation spermatozoa are formed.
  - In spermiogenesis spermatozoa from sertoli cells are released into the cavity of seminiferous tubules, while in spermiation spermatozoa are formed.
  - In spermiogenesis spermatozoa are formed, while in spermiation spermatids are formed.
  - In spermiogenesis spermatozoa are formed, while in spermiation spermatozoa are released from sertoli cells into the cavity of seminiferous tubules.

### Breathing and Exchange of Gases

65. Which of the following options correctly represents the lung conditions in asthma and emphysema, respectively?
- Inflammation of bronchioles; Decreased respiratory surface
  - Increased respiratory surface; Inflammation of bronchioles
  - Increased number of bronchioles; Increased respiratory surface
  - Decreased respiratory surface; Inflammation of bronchioles

### Body Fluids and Circulation

66. Match the items given Column I with those in Column II and select the correct option given below:

| Column I            | Column II   |
|---------------------|---|
| (a) Tricuspid valve | (i) Between left atrium and left ventricle        |
| (b) Bicuspid valve  | (ii) Between right ventricle and pulmonary artery |
| (c) Semilunar valve | (iii) Between right atrium and right ventricle    |

#### Options:

- (a) (b) (c)
- (a) (iii) (i) (ii)
- (b) (i) (ii) (iii)
- (c) (i) (iii) (ii)
- (d) (ii) (i) (iii)

### Breathing and Exchange of Gases

67. Match the items given in Column I with those in Column II and select the correct option given below:

| Column I                       | Column II           |
|--------------------------------|---------------------|
| (a) Tidal volume               | (i) 2500 – 3000 mL  |
| (b) Inspiratory Reserve volume | (ii) 1100 – 1200 mL |
| (c) Expiratory Reserve volume  | (iii) 500 – 550 mL  |
| (d) Residual volume            | (iv) 1000 – 1100 mL |

#### Options:

- (a) (b) (c) (d)
- (a) (iii) (ii) (i) (iv)
- (b) (i) (iv) (ii) (iii)
- (c) (iii) (i) (iv) (ii)
- (d) (iv) (iii) (ii) (i)

**Excretory Products and Their Elimination**

68. Match the items given in Column I with those in Column II and select the correct option given below:

| Column I                 | Column II   |
|--------------------------|---|
| (a) Glycosuria           | (i) Accumulation of uric acid in joints           |
| (b) Gout                 | (ii) Mass of crystallised salts within the kidney |
| (c) Renal calculi        | (iii) Inflammation in glomeruli                   |
| (d) Glomerular nephritis | (iv) Presence of glucose in urine                 |

**Options:**

- (a) (b) (c) (d)  
 (a) (iii) (ii) (iv) (i)  
 (b) (ii) (iii) (i) (iv)  
 (c) (i) (ii) (iii) (iv)  
 (d) (iv) (i) (ii) (iii)

**Excretory Products and Their Elimination**

69. Match the items given in Column I with those in Column II and select the correct option given below:

| Column I<br>(Function)     | Column II<br>(Part of Excretory System) |
|----------------------------|---|
| (a) Ultrafiltration        | (i) Henle's loop                        |
| (b) Concentration of urine | (ii) Ureter                             |
| (c) Transport of urine     | (iii) Urinary bladder                   |
| (d) Storage of urine       | (iv) Malpighian corpuscle               |
|                            | (v) Proximal convoluted tubule          |

**Options:**

- (a) (b) (c) (d)  
 (a) (iv) (v) (ii) (iii)  
 (b) (v) (iv) (i) (ii)  
 (c) (iv) (i) (ii) (iii)  
 (d) (v) (iv) (i) (iii)

**Cell the Unit of Life**

70. Which of the following events does not occur in rough endoplasmic reticulum?  
 (a) Protein folding (b) Cleavage of signal peptide  
 (c) Protein glycosylation (d) Phospholipid synthesis

**Respiration in Plants**

71. Which of these statements is incorrect?  
 (a) Enzymes of TCA cycle are present in mitochondrial matrix.  
 (b) Glycolysis operates as long as it is supplied with NAD that can pick up hydrogen atoms.  
 (c) Glycolysis occurs in cytosol.  
 (d) Oxidative phosphorylation takes place in outer mitochondrial membrane.

**Neural Control and Coordination**

72. Nissl bodies are mainly composed of
- Proteins and lipids
  - Nucleic acids and SER
  - DNA and RNA
  - Free ribosomes and RER

**Digestion and Absorption**

73. Which of the following terms describe human dentition?
- Thecodont, Diphyodont, Homodont
  - Pleurodont, Monophyodont, Homodont
  - Thecodont, Diphyodont, Heterodont
  - Pleurodont, Diphyodont, Heterodont

**Cell Cycle and Cell Division**

74. Select the incorrect match:
- |                                 |                       |
|---------------------------------|-----------------------|
| (a) Lampbrush chromosomes:      | Diplole bivalents     |
| (b) Submetacentric chromosomes: | L-shaped chromosomes  |
| (c) Allosomes :                 | Sex chromosomes       |
| (d) Polytene Chromosomes:       | Oocytes of amphibians |

**Cell the Unit of Life**

75. Many ribosomes may associate with a single mRNA to form multiple copies of a polypeptide simultaneously. Such strings of ribosomes are termed as
- |                       |                |
|-----------------------|----------------|
| (a) Polysome          | (b) Plastidome |
| (c) Polyhedral bodies | (d) Nucleosome |

**Evolution**

76. According to Hugo de Vries, the mechanism of evolution is
- |                             |                           |
|-----------------------------|---------------------------|
| (a) Multiple step mutations | (b) Phenotypic variations |
| (c) Saltation               | (d) Minor mutations       |

**Human Reproduction**

77. Match the items given in Column I with those in Column II and select the correct option given below:

| Column I                | Column II                            |
|-------------------------|--------------------------------------|
| (a) Proliferative Phase | (i) Breakdown of endometrical lining |
| (b) Secretory Phase     | (ii) Follicular Phase                |
| (c) Menstruation        | (iii) Luteal Phase                   |

**Options:**

- |           |       |      |
|-----------|-------|------|
| (a)       | (b)   | (c)  |
| (a) (iii) | (ii)  | (i)  |
| (b) (ii)  | (iii) | (i)  |
| (c) (i)   | (iii) | (ii) |
| (d) (iii) | (i)   | (ii) |

**Molecular Basis of Inheritance**

78. All of the following are part of an operon except
- (a) An operator (b) An enhancer  
(c) Structural genes (d) A promoter

**Molecular Basis of Inheritance**

79. AGGTATCGCAT is a sequence form the coding strand of a gene. What will be the corresponding sequence of the transcribed mRNA?
- (a) AGGUAUCGCAU (b) ACCUAUGCGAU  
(c) UGGTUTCGCAT (d) UCCAUAGCGUA

**Principles of Inheritance and Variation**

80. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by
- (a) Only daughters (b) Only grandchildren  
(c) Only sons (d) Both sons and daughters

**Digestion and Absorption**

81. Which of the following gastric cells indirectly help in erythropoiesis?
- (a) Chief cells (b) Goblet cells  
(c) Mucous cells (d) Parietal cells

**Body Fluids and Circulation**

82. Match the items given in Column I with those in Column II and select the correct option given below:

| Column I       | Column II               |
|----------------|-------------------------|
| (a) Fibrinogen | (i) Osmotic balance     |
| (b) Globulin   | (ii) Blood clotting     |
| (c) Albumin    | (iii) Defence mechanism |

**Options:**

- (a) (b) (c)  
(a) (iii) (ii) (i)  
(b) (i) (iii) (ii)  
(c) (i) (ii) (iii)  
(d) (ii) (iii) (i)

**Breathing and Exchange of Gases**

83. Which of the following is an occupational respiratory disorder?
- (a) Anthracis (b) Botulism  
(c) Silicosis (d) Emphysema

**Locomotion and Movement**

84. Calcium is important in skeletal muscle contraction because it
- (a) Binds to troponin to remove the masking of active sites on actin for myosin.  
(b) Detaches the myosin head from the actin filament.  
(c) Activates the myosin ATPase by binding to it.  
(d) Prevents the formation of bonds between the myosin cross bridges and the actin filament.



**Animal Kingdom**

85. Identify the vertebrate group of animals characterized by crop and gizzard in its digestive system.
- (a) Amphibia (b) Aves  
(c) Reptilia (d) Osteichthyes

**Biological Classification**

86. Ciliates differ from all other protozoans in
- (a) Using flagella for locomotion  
(b) Using pseudopodia for capturing prey  
(c) Having a contractile vacuole for removing excess water  
(d) Having two types of nuclei

**Structural Organization in Animals**

87. Which of the following features is used to identify a male cockroach from a female cockroach?
- (a) Presence of a boat shaped sternum on the 9<sup>th</sup> abdominal segment.  
(b) Forewings with darker tegmina  
(c) Presence of caudal styles  
(d) Presence of anal cerci

**Animal Kingdom**

88. Which one of these animals is not a homeotherm?
- (a) *Macropus* (b) *Camelus*  
(c) *Chelone* (d) *Psittacula*

**Structural Organization in Animals**

89. Which of the following animals does not undergo metamorphosis?
- (a) Earthworm (b) Moth  
(c) Tunicate (d) Starfish

**Biological Classification**

90. Which of the following organisms are known as chief producers in the oceans?
- (a) Dinoflagellates (b) Cyanobacteria  
(c) Diatoms (d) Euglenoids

**Answer Keys**

- |         |         |         |         |         |         |         |         |         |            |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| 1. (a)  | 2. (a)  | 3. (c)  | 4. (a)  | 5. (d)  | 6. (c)  | 7. (b)  | 8. (c)  | 9. (d)  | 10. (c)    |
| 11. (a) | 12. (c) | 13. (a) | 14. (d) | 15. (a) | 16. (d) | 17. (d) | 18. (c) | 19. (d) | 20. (a)    |
| 21. (d) | 22. (d) | 23. (b) | 24. (c) | 25. (c) | 26. (a) | 27. (c) | 28. (c) | 29. (a) | 30. (b)    |
| 31. (d) | 32. (c) | 33. (d) | 34. (a) | 35. (c) | 36. (b) | 37. (d) | 38. (a) | 39. (b) | 40. (c)    |
| 41. (a) | 42. (d) | 43. (b) | 44. (a) | 45. (d) | 46. (a) | 47. (c) | 48. (a) | 49. (b) | 50. (d)    |
| 51. (b) | 52. (c) | 53. (a) | 54. (a) | 55. (b) | 56. (b) | 57. (c) | 58. (b) | 59. (a) | 60. (c)    |
| 61. (b) | 62. (a) | 63. (a) | 64. (d) | 65. (a) | 66. (a) | 67. (c) | 68. (d) | 69. (c) | 70. (c, d) |
| 71. (d) | 72. (d) | 73. (c) | 74. (d) | 75. (a) | 76. (c) | 77. (b) | 78. (b) | 79. (a) | 80. (d)    |
| 81. (d) | 82. (d) | 83. (c) | 84. (a) | 85. (b) | 86. (d) | 87. (c) | 88. (c) | 89. (a) | 90. (c)    |

# National Eligibility Cum Entrance Test: Biology 2017

---

## Strategies for Food Production

1. Homozygous purelines in cattle can be obtained by
  - (a) Mating of unrelated individuals of same breed
  - (b) Mating of individuals of different breed
  - (c) Mating of individuals of different species
  - (d) Mating of related individuals of same breed

## Reproductive Health

2. The function of copper ions in copper releasing IUD's is
  - (a) They inhibit gametogenesis
  - (b) They make uterus unsuitable for implantation
  - (c) They inhibit ovulation
  - (d) They suppress sperm motility and fertilizing capacity of sperms

## Principle of Inheritance and Variation

3. Among the following characters, which one was not considered by Mendel in his experiments on pea?
  - (a) Trichomes - Glandular or non-glandular
  - (b) Seed - Green or yellow
  - (c) Pod - Inflated or constricted
  - (d) Stem - Tall or dwarf

## Animal Kingdom

4. In case of poriferans, the spongocoel is lined with flagellated cells called
  - (a) Oscula
  - (b) Choanocytes
  - (c) Mesenchymal cells
  - (d) Ostia

## Sexual Reproduction in Flowering Plants

5. Flowers which have single ovule in the ovary and are packed into inflorescence are usually pollinated by
  - (a) Bee
  - (b) Wind
  - (c) Bat
  - (d) Water

## Environmental Issues

6. Which one of the following statements is not valid for aerosols?
  - (a) They alter rainfall and monsoon patterns.
  - (b) They cause increased agricultural productivity.
  - (c) They have negative impact on agricultural land.
  - (d) They are harmful to human health.

**Biological Classification**

7. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen?
- (a) Pseudomonas (b) Mycoplasma  
(c) Nostoc (d) Bacillus

**Morphology of Flowering Plants**

8. In Bougainvillea thorns are the modification of
- (a) Adventitious root (b) Stem  
(c) Leaf (d) Stipules

**Cell Cycle and Cell Division/Molecular Basis of Inheritance**

9. DNA replication in bacteria occurs
- (a) Within nucleolus (b) Prior to fission  
(c) Just before transcription (d) During S phase

**Sexual Reproduction in Flowering Plants**

10. Functional megaspore in an angiosperm develops into
- (a) Endosperm (b) Embryo sac  
(c) Embryo (d) Ovule

**Cell Cycle and Cell Division**

11. Anaphase Promoting Complex (APC) is a protein degradation machinery necessary for proper mitosis of animal cells. If APC is defective in a human cell, then which of the following is expected to occur?
- (a) Chromosomes will be fragmented  
(b) Chromosomes will be not segregate  
(c) Recombination of chromosome arms will occur  
(d) Chromosomes will not condense

**Anatomy of Flowering Plants**

12. Which of the following is made up of dead cells?
- (a) Collenchyma (b) Phellem  
(c) Phloem (d) Xylem parenchyma

**Biotechnology: Principles and Process**

13. What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis?
- (a) The smaller the fragment size, the farther it moves.  
(b) Positively charged fragments move to farther end.  
(c) Negatively charged fragments do not move.  
(d) The larger the fragment size, the farther it moves.

**Anatomy of Flowering Plants**

14. Identify the wrong statement in context of heartwood?
- (a) It is highly durable.  
(b) It conducts water and minerals efficiently.  
(c) It comprises of dead elements with highly lignified walls.  
(d) Organic compounds are deposited in it.

**Plant Kingdom**

15. An example of colonial alga is

- (a) Volvox (b) Ulothrix  
(c) Spirogyra (d) Chlorella

**Plant Kingdom**

16. Zygotic meiosis is a characteristic of

- (a) Fucus (b) Funaria  
(c) Chlamydomonas (d) Marchantia

**Biomolecules**

17. Which of the following statements is correct, with reference to enzymes?

- (a) Holoenzyme = Apoenzyme + Coenzyme  
(b) Coenzyme = Apoenzyme + Holoenzyme  
(c) Holoenzyme = Apoenzyme + Co-factor  
(d) Apoenzyme = Holoenzyme + Coenzyme

**Principle of Inheritance and Variation**

18. A disease caused by an autosomal primary non-disjunction is

- (a) Klinefelter's syndrome (b) Turner's syndrome  
(c) Sickle cell Anaemia (d) Down's syndrome

**Biotechnology: Principles and Process**

19. A gene whose expression helps to identify transformed cell is known as

- (a) Vector (b) Plasmid  
(c) Structural gene (d) Selectable marker

**Morphology of Flowering Plants**

20. Plants which produce characteristic pneumatophores and show vivipary belong to

- (a) Halophytes (b) Psammophytes  
(c) Hydrophytes (d) Mesophytes

**Photosynthesis in Higher Plants**

21. With reference to factors affecting the rate of photosynthesis, which of the following statements is not correct?

- (a) Increasing atmospheric  $\text{CO}_2$  concentration up to 0.05 per cent can enhance  $\text{CO}_2$  fixation rate.  
(b)  $\text{C}_3$  plants respond to higher temperatures with enhanced photosynthesis while  $\text{C}_4$  plants have much lower temperature optimum.  
(c) Tomato is a greenhouse crop which can be grown in  $\text{CO}_2$  enriched atmosphere for higher yield.  
(d) Light saturation for  $\text{CO}_2$  fixation occurs at 10 per cent of full sunlight.

**Structural Organization in Animals**

22. Select the correct route for the passage of sperms in male frogs.

- (a) Testes → Vasa efferentia → Kidney → Seminal Vesicle → Urinogenital duct → Cloaca  
(b) Testes → Vasa efferentia → Bidder's canal Ureter → Cloaca  
(c) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca  
(d) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca

**Breathing and Exchange of Gases**

23. Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration because of
- (a) Inspiratory reserve volume (b) Tidal volume  
(c) Expiratory reserve volume (d) Residual volume

**Plant Kingdom**

24. Life cycle of ectocarpus and fucus respectively are
- (a) Diplontic, Haplodiplontic (b) Haplodiplontic, Diplontic  
(c) Haplodiplontic, Haplontic (d) Haplontic, Diplontic

**Biological Classification**

25. Viroids differ from viruses in having
- (a) DNA molecules without protein coat (b) RNA molecules with protein coat  
(c) RNA molecules without protein coat (d) DNA molecules with protein coat

**Ecosystem**

26. Which ecosystem has the maximum biomass?
- (a) Grassland ecosystem (b) Pond ecosystem  
(c) Lake ecosystem (d) Forest ecosystem

**Organisms and Population**

27. Asymptote in a logistic growth curve is obtained when
- (a)  $K = N$  (b)  $K > N$   
(c)  $K < N$  (d) The value of 'r' approaches zero

**Biodiversity and its Conservation**

28. Alexander Von Humboldt described for the first time
- (a) Laws of limiting factor (b) Species area relationships  
(c) Population growth equation (d) Ecological biodiversity

**Excretory Products and their Elimination**

29. Which of the following statements is correct?
- (a) The descending limb of loop of Henle is impermeable to water.  
(b) The ascending limb of loop of Henle is permeable to water.  
(c) The descending limb of loop of Henle is permeable to electrolytes.  
(d) The ascending limb of loop of Henle is impermeable to water.

**Biotechnology: Principles and Process**

30. The process of separation and purification of expressed protein before marketing is called
- (a) Downstream processing (b) Bioprocessing  
(c) Postproduction processing (d) Upstream processing

**Body Fluids and Circulation**

31. Adult human RBCs are enucleate. Which of the following statement(s) is/are the most appropriate explanation for this feature?
- (a) They do not reproduce  
(b) They are somatic cells  
(c) They do not metabolize  
(d) All their internal space is available for oxygen transport

**Options:**

- (a) Only (a) (b) (a), (c) and (d)  
(c) (b) and (c) (d) Only (d)

**Microbes in Human Welfare**

32. Which of the following in sewage treatment removes suspended solids?  
(a) Secondary treatment (b) Primary treatment  
(c) Sludge treatment (d) Tertiary treatment

**Cell Cycle and Cell Division**

33. Which of the following components provides sticky character to the bacterial cell?  
(a) Nuclear membrane (b) Plasma membrane  
(c) Glycocalyx (d) Cell wall

**Molecular Basis of Inheritance**

34. The final proof for DNA as the genetic material came from the experiments of  
(a) Hershey and Chase (b) Avery, Macleod and McCarty  
(c) Har Gobind Khorana (d) Griffith

**Biodiversity and its Conservation**

35. The region of biosphere reserve which is legally protected and where no human activity is allowed is known as  
(a) Buffer zone (b) Transition zone  
(c) Restoration zone (d) Core zone

**Molecular Basis of Inheritance**

36. During DNA replication, Okazaki fragments are used to elongate  
(a) The lagging strand towards replication fork.  
(b) The leading strand away from replication fork.  
(c) The lagging strand away from the replication fork.  
(d) The leading strand towards replication fork.

**Neural Control and Coordination**

37. Myelin sheath is produced by  
(a) Astrocytes and Schwann cells (b) Oligodendrocytes and osteoclasts  
(c) Osteoclasts and astrocytes (d) Schwann cells and oligodendrocytes

**Biomolecules**

38. Which of the following are not polymeric?  
(a) Proteins (b) Polysaccharides  
(c) Lipids (d) Nucleic acids

**Plant Kingdom**

39. Select the mismatch:  
(a) Cycas Dioecious  
(b) Salvinia Heteroporous  
(c) Equisetum Homosporous  
(d) Pinus Dioecious

**Molecular Basis of Inheritance**

40. The association of histone H1 with a nucleosome indicates
- (a) DNA replication is occurring
  - (b) The DNA is condensed into a chromatin fibre.
  - (c) The DNA double helix is exposed.
  - (d) Transcription is occurring.

**Sexual Reproduction in Flowering Plants**

41. Attractants and rewards are required for
- (a) Entomophily
  - (b) Hydrophily
  - (c) Cleistogamy
  - (d) Anemophily

**Respiration in Plants**

42. Which statement is wrong for Krebs cycle?
- (a) There is one point in the cycle where  $FAD^+$  is reduced to  $FADH_2$ .
  - (b) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesized.
  - (c) The cycle starts with condensation of acetyl group (acetyl CoA) with pyruvic acid to yield citric acid.
  - (d) There are three points in the cycle where  $NAD^+$  is reduced to  $NADH+H^+$ .

**Animal Kingdom**

43. Which among these is the correct combination of aquatic mammals?
- (a) Dolphins, Seals, Trygon
  - (b) Whales, Dolphins, Seals
  - (c) Trygon, Whales, Seals
  - (d) Seals, Dolphins, Sharks

**Chemical Coordination and Regulation****Human Reproduction**

44. A temporary endocrine gland in the human body is
- (a) Corpus cardiacum
  - (b) Corpus luteum
  - (c) Corpus allatum
  - (d) Pineal gland

**Reproductive Health**

45. In case of couple where the male is having a very low sperm count, which technique will be suitable for fertilization?
- (a) GIFT (Gamete Intracytoplasmic)
  - (b) Artificial insemination
  - (c) Intracytoplasmic sperm injection
  - (d) Intrauterine transfer

**Morphology of Flowering Plants**

46. Coconut fruit is a
- (a) Berry
  - (b) Nut
  - (c) Capsule
  - (d) Drupe

**Human Reproduction**

47. Capacitation occurs in
- (a) Epididymis
  - (b) Vas deferens
  - (c) Female reproductive tract
  - (d) Rete testis

**Chemical Coordination and Regulation**

48. Hypersecretion of growth hormone in adults does not cause further increase in height, because
- Epiphyseal plates close after adolescence.
  - Bones lose their sensitivity to growth hormone in adults.
  - Muscle fibres do not grow in size after birth.
  - Growth hormone becomes inactive in adults.

**Biotechnology: Principles and Process**

49. The DNA fragments separated on an agarose gel can be visualized after staining with
- Acetocarmine
  - Aniline blue
  - Ethidium bromide
  - Bromophenol blue

**Reproductive Health**

50. Match the following sexually transmitted diseases (Column-I) with their causative agent (Column-II) and select the correct option.

| Column-I          | Column-II                  |
|-------------------|----------------------------|
| (a) Gonorrhoea    | (i) HIV                    |
| (b) Syphilis      | (ii) Neisseria             |
| (c) Genital warts | (iii) Treponema            |
| (d) AIDS          | (iv) Human Papilloma Virus |

**Options:**

- |           |       |       |      |
|-----------|-------|-------|------|
| (a)       | (b)   | (c)   | (d)  |
| (a) (iii) | (iv)  | (i)   | (ii) |
| (b) (iv)  | (ii)  | (iii) | (i)  |
| (c) (iv)  | (iii) | (ii)  | (i)  |
| (d) (ii)  | (iii) | (iv)  | (i)  |

**Mineral Nutrition**

51. Select the mismatch:

- |                    |                |
|--------------------|----------------|
| (a) Rhodospirillum | Mycorrhiza     |
| (b) Anabaena       | Nitrogen fixer |
| (c) Rhizobium      | Alfalfa        |
| (d) Frankia        | Alnus          |

**Structural Organization in Animals**

52. Frogs heart when taken out of the body continues to beat for some time. Select the best option from the following statement.
- Frog is a poikilotherm.
  - Frog does not have any coronary circulation.
  - Heart is 'myogenic' in nature.
  - Heart is autoexcitable.

**Options:**

- |                 |                 |
|-----------------|-----------------|
| (a) Only (d)    | (b) (a) and (b) |
| (c) (c) and (d) | (d) Only (c)    |



**Organisms and Population**

53. Mycorrhizae are the example of
- |                |                 |
|----------------|-----------------|
| (a) Amensalism | (b) Antibiosis  |
| (c) Mutualism  | (d) Fungistasis |

**Excretory Products and their Elimination**

54. A decrease in blood pressure/volume will not cause the release of
- |                               |                 |
|-------------------------------|-----------------|
| (a) Atrial natriuretic factor | (b) Aldosterone |
| (c) ADH                       | (d) Renin       |

**Biodiversity and its Conservation**

55. Which one of the following is related to *ex situ* conservation of threatened animals and plants?
- |                            |                           |
|----------------------------|---------------------------|
| (a) Biodiversity hot spots | (b) Amazon rainforest     |
| (c) Himalayan region       | (d) Wildlife safari parks |

**Digestion and Absorption**

56. Which cells of 'Crypts of Lieberkuhn' secrete antibacterial lysozyme?
- |                   |                       |
|-------------------|-----------------------|
| (a) Paneth cells  | (b) Zymogen cells     |
| (c) Kupffer cells | (d) Argentaffin cells |

**Morphology of Flowering Plants**

57. Root hairs develop from the region of
- |                           |                |
|---------------------------|----------------|
| (a) Elongation            | (b) Root cap   |
| (c) Meristematic activity | (d) Maturation |

**Neural Control and Coordination**

58. Good vision depends on adequate intake of carotene rich food. Select the best option from the following statements.
- |  |
|--|
| (a) Vitamin A derivatives are formed from carotene.                            |
| (b) The photopigments are embedded in the membrane discs of the inner segment. |
| (c) Retinal is a derivative of Vitamin A.                                      |
| (d) Retinal is light absorbing part of all the visual photopigments.           |

**Options:**

- |                      |                 |
|----------------------|-----------------|
| (a) (a), (c) and (d) | (b) (a) and (c) |
| (c) (b), (c) and (d) | (d) (a) and (b) |

**Digestion and Absorption**

59. A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent?
- |             |                |
|-------------|----------------|
| (a) Canines | (b) Pre-molars |
| (c) Molars  | (d) Incisors   |

**Ecosystem**

60. The presence of plants arranged into well-defined vertical layers depending on their height can be seen best in
- |                          |                       |
|--------------------------|-----------------------|
| (a) Tropical rain forest | (b) Grassland         |
| (c) Temperate forest     | (d) Tropical savannah |

**Principle of Inheritance and Variation**

61. Thalassaemia and sickle cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement.
- (a) Both are due to a quantitative defect in globin chain synthesis.
  - (b) Thalassaemia is due to less synthesis of globin molecules.
  - (c) Sickle cell anaemia is due to a quantitative problem of globin molecules.
  - (d) Both are due to a qualitative defect in globin chain synthesis.

**Chemical Coordination and Regulation**

62. GnRH, a hypothalamic hormone, needed in reproduction, acts on
- (a) Anterior pituitary gland and stimulates secretion of LH and FSH.
  - (b) Posterior pituitary gland and stimulates secretion of oxytocin and FSH.
  - (c) Posterior pituitary gland and stimulates secretion of LH and relaxin.
  - (d) Anterior pituitary gland and stimulates secretion of LH and Oxytocin.

**Plant Growth and Development**

63. Fruit and leaf drop at early stages can be prevented by the application of
- (a) Ethylene
  - (b) Auxins
  - (c) Gibberellic acid
  - (d) Cytokinins

**Locomotion and Movement**

64. Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation:
- (a) X = 12, Y = 5      True ribs are attached dorsally to vertebral column and sternum on the two ends.
  - (b) X = 24, Y = 7      True ribs are dorsally attached to vertebral column but are free on ventral side.
  - (c) X = 24, Y = 12      True ribs are dorsally attached to vertebral column but are free on ventral side.
  - (d) X = 12, Y = 7      True ribs are attached dorsally to vertebral column and ventrally to the sternum.

**Molecular Basis of Inheritance**

65. If there are 999 bases in an RNA that codes for a protein with 333 amino acids and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered?
- (a) 11
  - (b) 33
  - (c) 333
  - (d) 1

**The Unit of Life**

66. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?
- (a) Ribosome
  - (b) Chloroplast
  - (c) Mitochondrion
  - (d) Lysosome

**Biotechnology: Principles and Process**

67. DNA fragments are
- (a) Negatively charged
  - (b) Neutral
  - (c) Either positively or negatively charged depending on their size
  - (d) Positively charged

**Principle of Inheritance and Variation**

68. The genotypes of a husband and wife are  $I^A I^B$  and  $I^A i$ . Among the blood types of their children, how many different genotypes and phenotypes are possible?
- (a) 3 genotypes; 4 phenotypes
  - (b) 4 genotypes; 3 phenotypes
  - (c) 4 genotype; 4 phenotypes
  - (d) 3 genotypes; 3 phenotypes

**Locomotion and Movement**

69. The pivot joint between atlas and axis is a type of
- (a) Cartilaginous joint
  - (b) Synovial joint
  - (c) Saddle joint
  - (d) Fibrous joint

**Plant Kingdom**

70. Double fertilization is exhibited by
- (a) Algae
  - (b) Fungi
  - (c) Angiosperms
  - (d) Gymnosperms

**Transport in Plants**

71. The water potential of pure water is
- (a) Less than zero
  - (b) More than zero but less than one
  - (c) More than one
  - (d) Zero

**Sexual Reproduction in Flowering Plants**

72. A dioecious flowering plant prevents both
- (a) Autogamy and geitonogamy
  - (b) Geitonogamy and xenogamy
  - (c) Cleistogamy and xenogamy
  - (d) Autogamy and xenogamy

**Cell Cycle and Cell Division**

73. Which of the following options gives the correct sequence of events during mitosis?
- (a) Condensation → Nuclear membrane disassemble → Arrangement at equator → Centromere division → Segregation → Telophase
  - (b) Condensation → Crossing over → Nuclear membrane disassembly → Segregation → Telophase
  - (c) Condensation → Arrangement at equator → Centromere division → Segregation → Telophase
  - (d) Condensation → Nuclear membrane disassembly → Crossing over → Segregation → Telophase

**Anatomy of Flowering Plants**

74. The vascular cambium normally gives rise to
- (a) Primary phloem
  - (b) Secondary xylem
  - (c) Periderm
  - (d) Phelloderm

**Principle of Inheritance and Variation**

75. Which one from those given below is the period for Mendel's hybridization experiments?
- (a) 1840–1850 (b) 1857–1869  
(c) 1870–1877 (d) 1856–1863

**Digestion and Absorption**

76. Which of the following best represents the enzyme composition of pancreatic juice?
- (a) amylase, pepsin, trypsinogen, maltase  
(b) peptidase, amylase, pepsin, rennin  
(c) lipase, amylase, trypsinogen, procarboxypeptidase  
(d) amylase, peptidase, trypsinogen, rennin

**Sexual Reproduction in Flowering Plants**

77. The morphological nature of the edible part of coconut is
- (a) Cotyledon (b) Endosperm  
(c) Pericarp (d) Perisperm

**Molecular Basis of Inheritance**

78. Which of the following RNAs should be most abundant in animal cell?
- (a) tRNA (b) mRNA  
(c) miRNA (d) rRNA

**Body Fluids and Circulation**

79. The hepatic portal vein drains blood to liver from
- (a) Stomach (b) Kidneys  
(c) Intestine (d) Heart

**The Living World**

80. Which of the following represents the order of 'Horse'?
- (a) *Perissodactyla* (b) *Caballus*  
(c) *Ferus* (d) *Equidae*

**Human Health and Disease**

81. MALT constitutes about \_\_\_\_\_ present of the lymphoid tissue in human body.
- (a) 20% (b) 70%  
(c) 10% (d) 50%

**Biological Classification**

82. Which of the following are found in extreme saline conditions?
- (a) Eubacteria (b) Cyanobacteria  
(c) Mycobacteria (d) Archaeobacteria

**Transport in Plants**

83. Which of the following facilitates the opening of stomatal aperture?
- (a) Decrease in turgidity of guard cells.  
(b) Radial orientation of cellulose microfibrils in the cell wall of guard cells.  
(c) Longitudinal orientation of cellulose microfibrils in the cell wall of guard cells.  
(d) Contraction of outer wall of guard cells.

**Microbes in Human Welfare**

84. Which of the following is correctly matched for the product produced by them?
- |                                       |                                      |
|---------------------------------------|--------------------------------------|
| (a) Methanobacterium : Lactic acid    | (b) Penicillium notatum: Acetic acid |
| (c) Saccharomyces cerevisiae: Ethanol | (d) Acetobacter aceti: Antibiotics   |

**Evolution**

85. Artificial selection to obtain cows yielding higher milk output represents
- Directional as it pushes the mean of the character in one direction.
  - Disruptive as it splits the population into two, one yielding higher output and the other lower output.
  - Stabilizing followed by disruptive as it stabilizes the population to produce higher yielding cows.
  - Stabilizing selection as it stabilizes this character in the population.

**Neural Control and Coordination**

86. Receptor sites neurotransmitters are present on
- |                            |                                    |
|----------------------------|------------------------------------|
| (a) Pre-synaptic membrane  | (b) Tips of axons                  |
| (c) Post-synaptic membrane | (d) Membranes of synaptic vesicles |

**Animal Kingdom**

87. An important characteristic that hemichordates share with chordates is
- |                                |                             |
|--------------------------------|-----------------------------|
| (a) Ventral tubular nerve cord | (b) Pharynx with gill slits |
| (c) Pharynx without gill slits | (d) Absence of notochord    |

**Human Health and Disease**

88. Transplantation of tissues/organs fails often due to non-acceptance by the patient's body. Which type of immune is responsible for such rejections?
- |                                   |                              |
|-----------------------------------|------------------------------|
| (a) Cell-mediated immune response | (b) Hormonal immune response |
| (c) Physiological immune response | (d) Autoimmune response      |

**Molecular Basis of Inheritance**

89. Spliceosomes are not found in the cells of
- |              |             |
|--------------|-------------|
| (a) Fungi    | (b) Animals |
| (c) Bacteria | (d) Plants  |

**Photosynthesis in Higher Plants**

90. Phosphoenolpyruvate (PEP) is the primary CO<sub>2</sub> acceptor in
- |  |                           |
|--|---------------------------|
| (a) C <sub>4</sub> plants                    | (b) C <sub>2</sub> plants |
| (c) C <sub>3</sub> and C <sub>4</sub> plants | (d) C <sub>3</sub> plants |

**Answer Keys**

|         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d)  | 2. (d)  | 3. (a)  | 4. (b)  | 5. (b)  | 6. (b)  | 7. (b)  | 8. (b)  | 9. (b)  | 10. (b) |
| 11. (b) | 12. (b) | 13. (a) | 14. (b) | 15. (a) | 16. (c) | 17. (a) | 18. (d) | 19. (d) | 20. (a) |
| 21. (b) | 22. (c) | 23. (d) | 24. (b) | 25. (c) | 26. (d) | 27. (a) | 28. (b) | 29. (d) | 30. (a) |
| 31. (d) | 32. (b) | 33. (c) | 34. (a) | 35. (d) | 36. (c) | 37. (d) | 38. (c) | 39. (d) | 40. (b) |
| 41. (a) | 42. (c) | 43. (b) | 44. (b) | 45. (b) | 46. (d) | 47. (c) | 48. (a) | 49. (c) | 50. (d) |
| 51. (a) | 52. (c) | 53. (c) | 54. (a) | 55. (d) | 56. (a) | 57. (d) | 58. (a) | 59. (b) | 60. (a) |
| 61. (b) | 62. (a) | 63. (b) | 64. (d) | 65. (b) | 66. (c) | 67. (a) | 68. (b) | 69. (b) | 70. (c) |
| 71. (d) | 72. (a) | 73. (a) | 74. (b) | 75. (d) | 76. (c) | 77. (b) | 78. (d) | 79. (c) | 80. (a) |
| 81. (d) | 82. (d) | 83. (b) | 84. (c) | 85. (a) | 86. (c) | 87. (b) | 88. (a) | 89. (c) | 90. (a) |

*This page is intentionally left blank.*

# Reproduction

**Chapter 1:** Reproduction in Organisms

**Chapter 2:** Sexual Reproduction in Flowering Plant

**Chapter 3:** Human Reproduction

**Chapter 4:** Reproductive Health

## Students Note

This unit is divided into four chapters such as Reproduction in Organisms, Sexual Reproduction in Flowering Plants, Human Reproduction and Reproductive Health. The unit is very important in understanding the process of reproduction, both in plants and animals. The chapter titled 'Human Reproduction' should be dealt with particular care as 3 to 5 questions are asked from this chapter. Figure based questions are very important and should be dealt with careful and special attention.



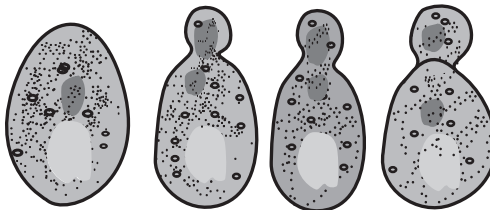
*This page is intentionally left blank.*

# Reproduction in Organisms

## PRACTICE QUESTIONS

### Asexual Reproduction

- Clones are
  - Morphologically similar
  - Genetically similar
  - Both (a) and (b)
  - None of these
- The approximate life span of a parrot is
  - 60 years
  - 1–2 weeks
  - 15 years
  - 140 years
- The approximate life span of a crocodile is
  - 60 years
  - 15 years
  - 150 years
  - 140 years
- Arrange the following in decreasing order of their life span.
  - Crocodile
  - Dog
  - Crow
  - Parrot
  - $1 > 2 > 3 > 4$
  - $2 > 3 > 4 > 1$
  - $4 > 1 > 2 > 3$
  - $4 > 1 > 3 > 2$
- Life span of a tortoise is approximately
  - 50–100 years
  - 100–150 years
  - 150–200 years
  - 200–250 years
- The given diagram shows:



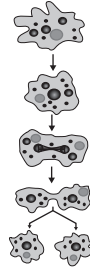
- Budding in bacteria
  - Binary fission in amoeba
  - Budding in yeast
  - Budding in sponge
- Sexual reproduction is characterized by
    - Two parent participation
    - Formation of gametes
    - Fusion of gametes
    - All of these
  - Asexual reproduction is common among all except
    - Unicellular organisms
    - Plants with simple organization
    - Animals with simple organization
    - Animals with complex organization

9. Name an organism where cell division is itself a mode of reproduction?

- (a) Amoeba (b) E. coli  
(c) Euglena (d) All of these

10. The given diagram shows

- (a) Budding in bacteria (b) Binary fission in amoeba  
(c) Budding in yeast (d) Budding in sponge



11. Cell division is synonymous with reproduction in

- (a) Plants and fungi (b) Animal and plant  
(c) Protista and monera (d) Monera and algae

12. Binary fission is seen in

- (a) Amoeba (b) Paramecium  
(c) Vorticella (d) All of these

13. Which of these organisms show budding?

- (a) Yeast (b) Hydra  
(c) Sponge (d) All of these

14. Find the false statement.

- (A) In yeast unequal division leads to bud formation.  
(B) When offspring is produced by a single parent with or without the involvement of gamete formation, the reproduction is asexual.  
(C) Size of crows and parrots are not very different yet their life span shows a wide difference.  
(D) In binary fission cell divides in unequal parts.

- (a) Only B and D (b) Only C  
(c) Only D (d) Only A and B

15. The approximate life span of the organism shown in the given diagram is



- (a) 5 years (b) 15 years  
(c) 25 years (d) 50 years

16. Match column-I (Organism) with column-II (reproductive structure).

| Column-I        | Column-II                      |
|-----------------|--------------------------------|
| (A) Penicillium | (1) Conidia                    |
| (B) Hydra       | (2) Exogenous bud              |
| (C) Sponge      | (3) Gemmules (Endogenous buds) |
| (D) Paramecium  | (4) Binary fission             |

- (a) A : 1, B : 2, C : 3, D : 4  
 (b) A : 4, B : 1, C : 3, D : 2  
 (c) A : 1, B : 3, C : 4, D : 2  
 (d) A : 2, B : 1, C : 4, D : 3

17. Select the incorrect statement.

- (a) Members of the Kingdom fungi and simple plants such as algae reproduce through special asexual reproductive structures.  
 (b) Zoospores are generally microscopic motile structures.  
 (c) Zoospores are usually macroscopic motile structures.  
 (d) Clones are morphologically and genetically similar individuals.




18. What are the units of vegetative propagation in plants?

- (a) Runners and rhizomes  
 (b) Suckers and bulbs  
 (c) Tuber and offset  
 (d) All of these

19. In plants, the units of vegetative propagation are capable of giving rise to new offspring. These structures are called

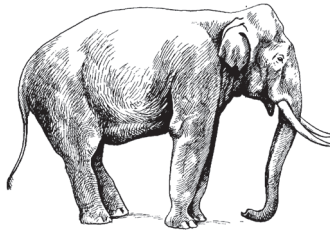
- (a) Zoospores  
 (b) Asexual spores  
 (c) Vegetative propagules  
 (d) Rhizomes

20. Match Column-I (Structure) with Column-II (Name of structure and its parent plant).

| Column-I   | Column-II                                      |
|--|--|
| A.  | 1. Bulbil of Agave                             |
| B.  | 2. Leaf buds of Bryophyllum                    |
| C.  | 3. Offset of water hyacinth (Terror of Bengal) |

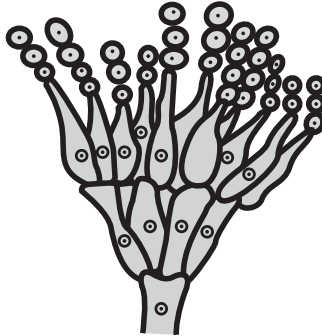
- (a) A:2, B:1, C:3  
 (b) A:1, B:2, C:3  
 (c) A:3, B:2, C:1  
 (d) A:2, B:3, C:1

21. Which is the incorrect statement about water hyacinth?  
 (a) Introduced in India for their lovely flowers and shape of leaves.  
 (b) It is world's most problematic terrestrial weed.  
 (c) It reproduce asexually through offsets  
 (d) Its botanical name is *Eicchornia crassipes*.
22. Vegetative propagules of *Agave* is  
 (a) Tuber (b) Rhizome  
 (c) Bulbil (d) Runner
23. Vegetative propagules of *Solanum tuberosum* is  
 (a) Tuber (b) Rhizome  
 (c) Bulbil (d) Offset
24. Select the odd one out.  
 (a) Tuber (b) Rhizome  
 (c) Bulbil (d) Zoospores
25. Rhizomes are vegetative propagules of  
 (a) Apple (b) Banana  
 (c) Mango (d) Grapes
26. Which of these points is false about the diagram?



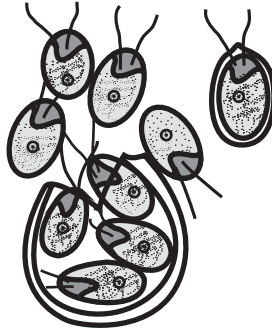
- (a) Belongs to class mammalia (b) Life span is approximately 40 years  
 (c) Belongs to genus *Elephas* (d) Crepuscular animal
27. Choose the correct statement.  
 (A) Asexual reproduction method is the common method of reproduction in organisms with relatively simple organization like algae and fungi.  
 (B) Organism with relatively simple organization like algae and fungi shifted to sexual mode of reproduction just before the onset of adverse conditions.  
 (C) Vegetative as well as sexual mode of reproduction is exhibited by the higher plants  
 (D) Only sexual mode of reproduction is present in most of the animals.
- (a) A and B only (b) B and C only  
 (c) C and D only (d) All A, B, C and D
28. Sexual reproduction when compared to asexual reproduction is a  
 (A) Slow process (B) Fast process  
 (C) Simple process (D) Complex process
- (a) A and D only (b) A and C only  
 (c) B and D only (d) B and C only

29. Plants, animals or fungi differ in all of these aspects except  
 (a) External morphology (b) Internal structure  
 (c) Physiology (d) Pattern of sexual mode of reproduction
30. Which of these plants do not show clear cut vegetative, reproductive and senescent phase?  
 (a) Annual plant (b) Biennial plant  
 (c) Perennial plant (d) All of these
31. Which information is false about the organism shown in the diagram?



- (a) Reproduce by basidiospores (b) It is a multicellular fungus  
 (c) It is the conidia of penicillium (d) Belongs to ascomycetes
32. Which of the following flowers only once in their lifetime?  
 (a) Mango (b) Neem  
 (c) Bamboo (d) All of these
33. Which of the following plant flowers once in 12 years?  
 (a) *Mangifera indica*  
 (b) *Strobilanthus kunthiana* (Neelakuranji)  
 (c) *Helianthus annuus*  
 (d) *Papver somniferum*
34. Which of these statement is true about *Strobilanthus kunthiana*?  
 (a) This plant flowers during September to October 2006.  
 (b) Its mass flowering transformed large tracks of hilly areas in Kerala, Karnataka and Tamil Nadu into blue stretches.  
 (c) It flowers once in 12 years.  
 (d) All the above
35. In animals, the juvenile phase is followed by what changes prior to active reproductive behaviour?  
 (a) Morphological changes (b) Physiological changes  
 (c) Genetical changes (d) Both (a) and (b)
36. Which of the following mammals show menstrual cycle?  
 (a) Monkeys (b) Apes  
 (c) Humans (d) All of these

37. The diagram shows:



- (a) Zoospores of hydra  
(b) Conidia of Penicillium  
(c) Gemmules in sponge  
(d) Zoospores of chlamydomonas
38. Oestrous cycle occurs in  
(a) Cows  
(b) Rats  
(c) Deer  
(d) All of these
39. Find the correct statement.  
(a) 'Reproductive phase' is of same duration in all organisms.  
(b) Birds in captivity can be made to lay eggs throughout the year.  
(c) Female of non-primates shows cyclical changes during reproductive phase which is known as menstrual cycle.  
(d) Perennial plants show clear cut vegetative, reproductive and senescent phase.
40. Most wild mammals are  
(a) Continuous breeder  
(b) Seasonal breeder  
(c) Continuous for half year, seasonal for next half year  
(d) None of these
41. Which of these statements is false about the diagram?

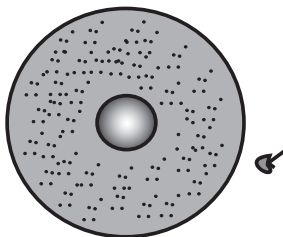


- (a) It represents the asexual reproductive structure of hydra.  
(b) It contains archaeocyte cells.  
(c) It represents asexual reproductive structure of sponges.  
(d) It shows gemmules in sponges.

42. 'Humans' are  
 (a) Seasonal breeder (b) Continuous breeder  
 (c) Both (a) and (b) (d) None of these
43. Which of the following can be considered as one of the parameter of senescence or old age?  
 (a) End of juvenile or vegetative phase (b) End of reproductive phase  
 (c) Hormonal imbalance (d) Slowing of metabolism due to disease

**Sexual Reproduction**

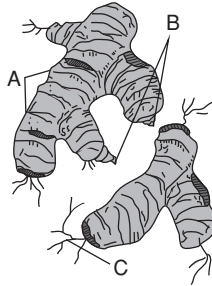
44. Pre-fertilization events among these are  
 (a) Syngamy (b) Gametogenesis and gamete transfer  
 (c) Formation of zygote (d) Embryogenesis
45. Gametes are generally  
 (a) Haploid (b) Triploid  
 (c) Diploid (d) Hexaploid
46. The diagram shows



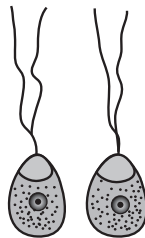
- (a) Homogametes of cladophora (b) Heterogametes of fucus  
 (c) Hetrogametes of cladophora (d) Heterogametes of fungus
47. Which of the following is/are male gametes?  
 (a) Egg (b) Ovum  
 (c) Antherozoids (d) Zygote
48. Count the total number of organisms which are monoecious.  
*Cucurbits, Coconut, Papaya, Date palm, Chara, Marchantia*  
 (a) 1 (b) 2 (c) 3 (d) 4
49. Archegoniophore is present in  
 (a) Chara (b) Papaya  
 (c) Marchantia (d) Fucus
50. Select the incorrect statement.  
 (a) Unisexual male flower is staminate.  
 (b) Unisexual female flower is pistillate.  
 (c) Heterothallic and dioecious are terms used to describe unisexual condition.  
 (d) Cockroach is a hermaphrodite.
51. Select the example/s of hermaphrodite organism/s among these.  
 (a) Earthworm (b) Tapeworm  
 (c) Leech (d) All of these



52. Identify A, B and C in the diagram.

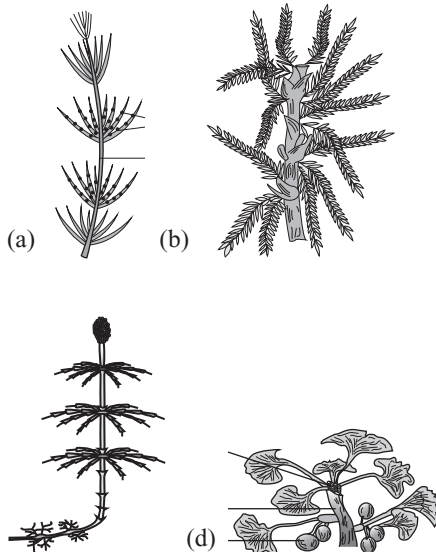
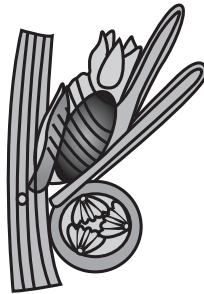


- (a) A: Nodes, B: Buds, C: Adventitious root  
 (b) A: Buds, B: Nodes, C: Tap root  
 (c) A: Adventitious root, B: Nodes, C: Buds  
 (d) A: Tap root, B: Nodes, C: Buds
53. Monoecious plants means  
 (A) Only male flowers are present in the plant.  
 (B) Only female flowers are present in the plant.  
 (C) Bisexual flowers are present in the plants.  
 (D) Separate male and female flowers are present in the same plant.  
 (a) Only A (b) Only D  
 (c) Only C (d) C and D both
54. Which of these organisms has/have haploid parental body?  
 (a) Monera and fungi (b) Algae  
 (c) Bryophytes (d) All of these
55. Which of these organisms has/have diploid parental body?  
 (a) Pteridophyte and gymnosperm (b) Angiosperm  
 (c) Most of the animals (d) All of these
56. Antheridiophore is present in  
 (a) Chara (b) Fucus  
 (c) Marchantia (d) Sweet potato
57. The diagram shows



- (a) Homogametes of cladophora (b) Homogametes of fucus  
 (c) Heterogametes of cladophora (d) Heterogametes of fungus

58. Find out the total number of organism whose gametes contain odd number of chromosomes.  
*Rat, Housefly, Dog, Cat, Apple, Rice, Maize, Potato, Onion*  
 (a) 3 (b) 4 (c) 5 (d) 6
59. Meicyte of which organism contains maximum number of chromosomes?  
 (a) Fruit fly (b) Butterfly  
 (c) Ophioglossum (a fern) (d) Human
60. Meicyte of cat contains how many chromosomes?  
 (a) 8 (b) 12 (c) 42 (d) 38
61. Identify the plant part given in the below diagram it belongs to which plant given in the options.

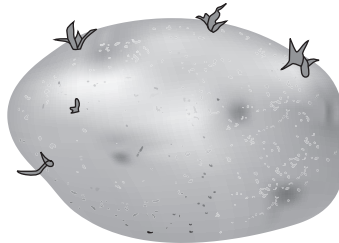


62. Water is a medium for gamete transfer in  
 (a) Bryophytes (b) Pteridophyte  
 (c) Algae (d) All of these

63. Which of these are carriers of male gamete in seed plants?  
 (a) Microspore mother cell (b) Megaspore mother cell  
 (c) Anther (d) Pollen grains
64. Transfer of pollen grains from anther to stigma is known as  
 (a) Emasculation (b) Pollination  
 (c) Bagging (d) Fertilization
65. The most critical event in sexual reproduction is  
 (a) Gametogenesis (b) Gamete transfer  
 (c) Fertilization (Syngamy) (d) Embryogenesis
66. Match column-I (Organism) with column-II (Chromosome number in meiocyte).

| Column-I     | Column-II |
|--------------|-----------|
| (A) Housefly | (1) 12    |
| (B) Apple    | (2) 34    |
| (C) Rice     | (3) 24    |
| (D) Rat      | (4) 42    |
| (E) Onion    | (5) 32    |

- (a) A:1, B:2, C:3, D:4, E:5 (b) A:2, B:3, C:1, D:4, E:5  
 (c) A:5, B:4, C:3, D:2, E:1 (d) A:3, B:2, C:1, D:4, E:5
67. Select the incorrect statement from the following.  
 (a) Few fungi and algae have motile male and motile female gametes.  
 (b) Most vital event of sexual reproduction is the fusion of gametes.  
 (c) Pea is a bisexual self-fertilizing plant.  
 (d) In majority of organisms male gamete is non-motile and female gamete is motile.
68. Parthenogenesis is shown by  
 (a) Rotifers (b) Honey bees  
 (c) Some lizards and birds (turkey) (d) All of these
69. Which of these statements is false about the diagram?



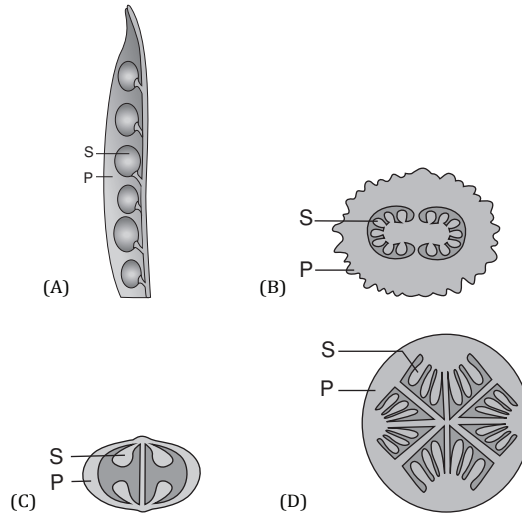
- (a) It belongs to the family solanaceae.  
 (b) It is a modified root meant for storage.  
 (c) It is a modified stem meant for reproduction.  
 (d) Eyes of the above structure are axillary buds.
70. External fertilization is seen in all of these except  
 (a) Algae (b) Amphibians (c) Fishes (d) Mammals

71. Find the incorrect statement.
- (a) Large number of gametes are released in surrounding water in external fertilization.
  - (b) Offspring produced by external fertilization are extremely vulnerable to predators.
  - (c) External fertilization is shown by bony fishes and frogs.
  - (d) In seed plant, the motile male gametes are carried to female gamete by pollen tubes.
72. Internal fertilization is seen in
- (a) Reptiles
  - (b) Birds
  - (c) Mammals
  - (d) All of these
73. Internal fertilization is seen in
- (a) Bryophytes
  - (b) Pteridophytes
  - (c) Gymnosperm and angiosperm
  - (d) All of these
74. Which of these characteristics belong to organisms showing internal fertilization?
- (a) Eggs are formed inside the female body where they fuse with male gamete.
  - (b) Male gametes are motile.
  - (c) Number of eggs produced is less in number
  - (d) All of the above
75. Development of embryo from zygote is
- (a) Parthenogenesis
  - (b) Embryogenesis
  - (c) Blastulation
  - (d) Gastrulation
76. Life in all organism starts from
- (a) Single cell zygote
  - (b) Two celled zygote
  - (c) Single cell embryo
  - (d) Multicellular embryo
77. Select the total number of true statements.
- (A) In organisms belonging to fungi and algae, the zygote develops a thick wall that is resistant to desiccation and damage.
  - (B) Formation of diploid zygote is universal in all sexually reproducing organisms.
  - (C) Syngamy occurs inside the body of the organism in internal fertilization.
  - (D) In organism with haplontic life cycle, the zygote divides by meiosis to form haploid spores that grow into haploid individuals.
- (a) 1                      (b) 2                      (c) 2                      (d) 4
78. The following are oviparous except
- (a) Crocodile
  - (b) Crow
  - (c) Parrot
  - (d) Horse
79. In oviparous animals like birds and reptiles the fertilized egg is covered by shell made up of \_\_\_\_\_.
- (a)  $\text{SiO}_2$
  - (b)  $\text{Na}_2\text{CO}_3$
  - (c)  $\text{CaCO}_3$
  - (d)  $\text{MgCO}_3$
80. The chances of survival of the young one is greater in
- (a) Internal fertilization
  - (b) External fertilization
  - (c) Oviparous animals
  - (d) Viviparous animals
81. After fertilization which part of flower generally withers and falls off?
- (a) Sepals
  - (b) Petals
  - (c) Stamens
  - (d) All of these

82. Select the false statement.

- (a) Ovule develops into seed (b) Ovary develops into fruit  
(c) Zygote develops into embryo (d) Placenta develops into pericarp

83. A, B, C and D shows which type of placentation respectively?



- (a) A: Marginal, B: Free central, C: Parietal, D: Axile  
(b) A: Parietal, B: Marginal, C: Axile, D: Free central  
(c) A: Axile, B: Free central, C: Marginal, D: Parietal  
(d) A: Axile, B: Parietal, C: Free central, D: Marginal

84. Gametes in haploid organisms are produced by

- (a) Amitosis (b) Mitosis  
(c) Meiosis (d) Cleavage

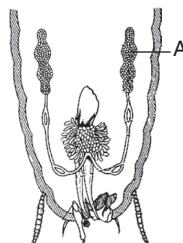
85. Embryonal protection and care are better in

- (a) Oviparity (b) Parthenogenesis  
(c) Viviparity (d) Polyembryony

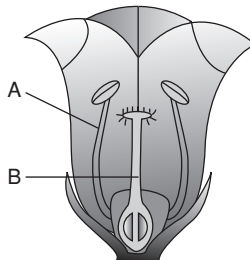
86. After fertilization in angiosperms, ovules develop into

- (a) Pericarp (b) Fruit (c) Seed (d) Embryo

87. 'A' in the diagram shows:

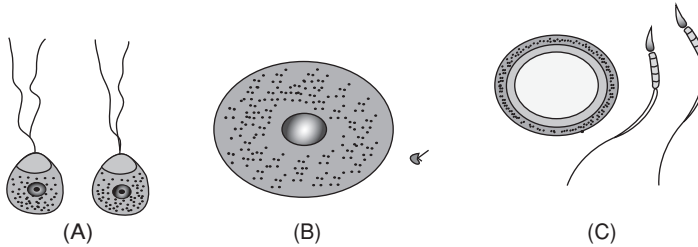


- (a) Testis of a male cockroach  
(b) Ovary of a female cockroach  
(c) Testis of an earthworm  
(d) Ovary of an earthworm
88. The progenitor of the next generation inside the mature seed is known as  
(a) Micropyle  
(b) Pericarp  
(c) Embryo  
(d) Zygote
89. Identify the ploidy of the following parts of flowering plants.  
*Ovary, Anther, Egg, Pollen, Male gamete and Zygote*  
(a)  $2n, 2n, n, n, n, 2n$   
(b)  $2n, 3n, n, n, 2n, 2n$   
(c)  $2n, n, n, n, n, 2n$   
(d)  $2n, 2n, n, 2n, n, 2n$
90. Select the correct statement from the following.  
(A) In flowering plants, the zygote is formed inside the ovule.  
(B) In reptiles and birds, the fertilized eggs covered by hard calcareous shell (Cleidoic) are laid in a safe place in environment.  
(C) In organisms belonging to fungi and algae, the zygote develops a thick wall that is vulnerable to desiccation and damage.  
(D) During embryogenesis, zygote undergoes cell division and cell differentiation.  
(a) A and C only  
(b) A, B and C only  
(c) C and D only  
(d) A, B and D only
91. Which of these statements is true about *Chara*?  
(a) Oogonium and antheridium are present on different plants.  
(b) Oogonium is placed in the upper part and antheridium in the lower part.  
(c) Oogonium is placed in the lower part and antheridium in the upper part.  
(d) *Chara* belongs to angiosperm.
92. Identify A and B in this diagram.



- (a) A: Anther, B: Sepals  
(b) A: Petals, B: Anther  
(c) A: Stamen, B: Carpel  
(d) A: Pistil, B: Stamen
93. Find the chromosome numbers in gamete ( $n$ ) of the following organisms respectively.  
*Human, Housefly, Rat, Dog, Cat, Fruitfly, Apple, Rice, Maize, Potato, Butterfly, Onion*  
(a) 23, 12, 12, 39, 19, 6, 17, 12, 10, 24, 190, 16  
(b) 23, 12, 21, 39, 19, 6, 17, 12, 20, 24, 190, 16  
(c) 23, 6, 21, 39, 19, 4, 17, 12, 10, 24, 190, 16  
(d) 23, 6, 12, 39, 19, 4, 17, 21, 10, 24, 190, 16

94. Identify A, B and C in the diagram.



- (a) A: Heterogametes of chlamydomonas  
B: Homogametes of fucus  
C: Heterogametes of homo sapiens
- (b) A: Homogametes of chara  
B: Heterogametes of fucus  
C: Heterogamete of homo sapiens
- (c) A: Homogamete of cladophora (a bryophyte)  
B: Heterogamete of fucus (an alga)  
C: Heterogamete of homo sapiens
- (d) A: Isogametes of cladophora (an alga)  
B: Heterogametes of fucus (an alga)  
C: Heterogametes of homo sapiens

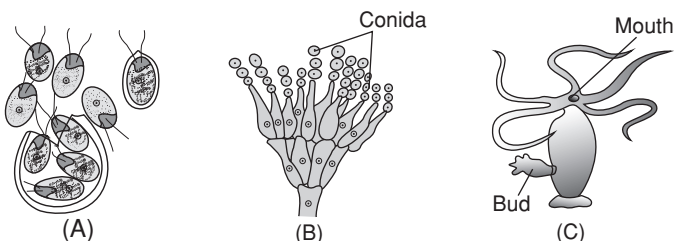
95. Adventitious buds arise from the notches present at margins of leaves in  
 (a) Potato (b) Offset (c) Bryophyllum (d) Turmeric

96. Most common type of reproduction in animals?  
 (a) Asexual (b) Vegetative  
 (c) Sexual (d) Gemmules formation

97. What is the number of non-primate mammals in this series?  
*Cow, Sheep, Rat, Deer, Dog, Tiger, Monkey, Human and Ape*  
 (a) 3 (b) 4 (c) 6 (d) 7

98. Rhizomes are present in  
 (a) Banana (b) Ginger  
 (c) Potato (d) Both (a) and (b)

99. Identify A, B and C in the figure.



- (a) A: Zoospores of chlamydomonas, B: Conidia of penicillium, C: Buds in hydra
- (b) A: Zoospores of chlamydomonas, B: Conidia of yeast, C: Buds in hydra
- (c) A: Conidia of penicillium, B: Zoospores of chlamydomonas, C: Buds in hydra
- (d) A: Zoospores of chlamydomonas, B: Ascospores of penicillium, C: Buds in hydra

100. Bulbils are vegetative propagules in

- (a) Water hyacinth
- (b) Agave
- (c) Potato
- (d) Tomato

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

- 101. **Assertion:** Asexual as well as sexual modes of reproduction are exhibited by the higher plants.  
**Reason:** Only sexual mode of reproduction is present in most of the animals.
- 102. **Assertion:** In sexual reproduction the offsprings are not identical to parents or amongst themselves.  
**Reason:** Sexual reproduction involves fusion of male and female gametes.
- 103. **Assertion:** Humans are called continuous breeders.  
**Reason:** Humans are reproductively active throughout.
- 104. **Assertion:** Zygote is the vital link that ensures continuity of species between organisms.  
**Reason:** Most vital events of sexual reproduction is the fusion of gametes.
- 105. **Assertion:** In flowering plant after fertilization, ovary develops into seeds.  
**Reason:** Ovules mature into fruits.
- 106. **Assertion:** In angiosperms the ovule develops into a seed after fertilization.  
**Reason:** Fertilization is not essential for the formation of fruit.
- 107. **Assertion:** Sexual reproduction is a simple and fast process.  
**Reason:** Asexual reproduction is a complex and slow process
- 108. **Assertion:** Organisms exhibiting external fertilization releases large number of gametes in to the surrounding medium.  
**Reason:** It will enhance the chance of syngamy.
- 109. **Assertion:** The chance of survival of young ones is greater in viviparous organism.  
**Reason:** Proper embryonic care and protection is available inside the body of female organism.
- 110. **Assertion:** All members of bee are diploid except the queen.  
**Reason:** Queen is produced parthenogenetically.
- 111. **Assertion:** Over growth of water hyacinth leads to death of fishes in aquatic body.  
**Reason:** Water hyacinth drains oxygen from water.



112. **Assertion:** Birds in captivity can be made to lay eggs through the year (poultry farm)  
**Reason:** Birds lay eggs seasonally.
113. **Assertion:** Period of growth before attaining sexual maturity is called Juvenile phase equal.  
**Reason:** Duration of juvenile phase in all organisms is same.
114. **Assertion:** Vegetative propagation is asexual process.  
**Reason:** Vegetative propagation doesn't involve two parents.
115. **Assertion:** Bamboo plant shows gregarious flowering.  
**Reason:** Bamboo plant flower once in their life time.
116. **Assertion:** In seed plants the fertilization is external.  
**Reason:** In seed plant male gamete is motile.
117. **Assertion:** Budding and gamete formation are the common asexual methods seen in animals.  
**Reason:** Asexual method does not involve the formation and fusion of gametes.
118. **Assertion:** Animals are always viviparous.  
**Reason:** Plants are always oviparous.
119. **Assertion:** Plants are defined as monoecious and dioecious  
**Reason:** Flowers may be bisexual and unisexual.

### PREVIOUS YEAR QUESTIONS

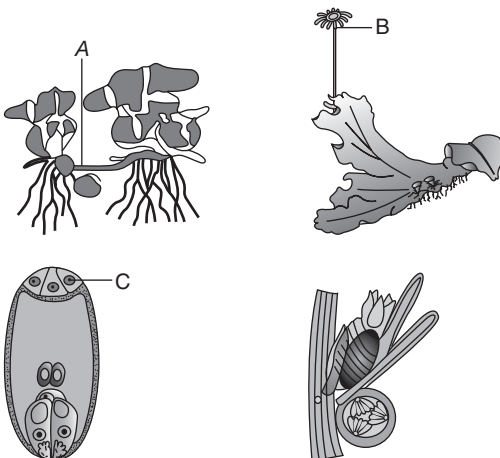
1. Which one of the following is monoecious?

[AIPMT MAINS 2010]

- (a) Marchantia  
 (b) Cycas  
 (c) Pinus  
 (d) Date palm

2. Examine the figures (A to D) given below and select the right option out (a to d), in which all the four structures A, B, C and D are identified correctly.

[AIPMT MAINS 2010]



- (a) A: Rhizome, B: Sporangiphore, C: Polar cell, D: Globule
- (b) A: Runner, B: Archegoniophore, C: Synergid, D: Antheridium
- (c) A: Offset, B: Antheridiophore, C: Antipodals, D: Oogonium
- (d) A: Sucker, B: Seta, C: Megaspore mother cell, D: Gemma cup

3. Vegetative propagation in Pistia occurs by

[AIPMT MAINS 2010]

- (a) Stolon
- (b) Offset
- (c) Runner
- (d) Sucker

4. Which one of the following pairs is wrongly matched while the remaining three are correct?

[AIPMT MAINS 2011]

- (a) Penicillium - Conidia
- (b) Water hyacinth - Runner
- (c) Bryophyllum - Leaf buds
- (d) Agave - Bulbils

5. Which one of the following is correctly matched?

[AIPMT PRE 2012]

- (a) Onion – Bulb
- (b) Ginger – Sucker
- (c) Chlamydomonas – Conidia
- (d) Yeast – Zoospores

6. The product of sexual reproduction generally generates

[AIPMT 2013]

- (a) Longer viability of seeds
- (b) Prolonged dormancy
- (c) New genetic combination leading to variation
- (d) Large biomass

7. Meiosis takes place in

[AIPMT 2013]

- (a) Meiocyte
- (b) Conidia
- (c) Gemmule
- (d) Megaspore

8. Monoecious plant of chara shows the occurrence of

[AIPMT 2013]

- (a) Antheridiophore and archegoniophore on the same plant.
- (b) Stamen and carpel on the same plant.
- (c) Upper antheridium and lower oogonium on the same plant.
- (d) Upper oogonium and lower antheridium on the same plant.

9. Which one of the following is wrong about chara?

[AIPMT 2014]

- (a) Upper oogonium and lower round antheridium
- (b) Globule and nucule present on the sap plant
- (c) Upper antheridium and lower oogonium
- (d) Globule is a male reproductive structure

10. In ginger, vegetative propagation occurs through [AIPMT 2015]  
 (a) Rhizome (b) Offsets  
 (c) Bulbils (d) Runners
11. Which of the following pairs is not correctly matched? [RE-AIPMT 2015]
- | Mode of reproduction | Example        |
|----------------------|----------------|
| (a) Rhizome          | Banana         |
| (b) Binary fission   | Sargassum      |
| (c) Conidia          | Penicillium    |
| (d) Offset           | Water hyacinth |
12. Roots play insignificant role in absorption of water in: [RE-AIPMT 2015]  
 (a) Pistia (b) Pea  
 (c) Wheat (d) Sunflower
13. In bryophytes and pteridophytes, transport of male gametes requires: [NEET - I, 2016]  
 (a) Wind (b) Insects  
 (c) Birds (d) Water
14. Which one of the following statements is not correct? [NEET - II, 2016]  
 (a) Microscopic, motile asexual reproductive structures are called zoospores.  
 (b) In potato, banana and ginger, the plantlets arise from the internodes present in then modified stem  
 (c) Water hyacinth, growing in the standing water, drains oxygen from water that leads to the death of fishes.  
 (d) Offsprings produced by the asexual reproduction are called clone

### NCERT EXEMPLAR QUESTIONS

1. A few statements describing certain features of reproduction are given below. Select the options that are true for both sexual and asexual reproduction from the options given:  
 i. Gametic fusion takes place.  
 ii. Transfer of genetic material takes place.  
 iii. Reduction division takes place.  
 iv. Progeny have some resemblance with parents.  
 (a) i and ii (b) ii and iii (c) ii and iv (d) i and iii
2. The term 'clone' cannot be applied to an offspring formed by sexual reproduction because  
 (a) Offspring do not possess exact copies of parental DNA.  
 (b) DNA of only one parent is copied and passed on to the offspring.  
 (c) Offspring are formed at different times.  
 (d) DNA of parent and offspring are completely different.
3. Amoeba and Yeast reproduce asexually by fission and budding respectively, because they are  
 (a) Microscopic organisms (b) Heterotrophic organism  
 (c) Unicellular organisms (d) Uninucleate organisms



- (c) Nodes are located near the soil  
(d) Nodes have non-photosynthetic cells
11. Which of the following statements, support the view that elaborate sexual reproductive process appeared much later in the organic evolution?
- Lower groups of organisms have simpler body design.
  - Asexual reproduction is common in lower groups.
  - Asexual reproduction is common in higher groups of organisms.
  - The high incidence of sexual reproduction in angiosperms and vertebrates.
- Choose the correct answer from the options given below:
- (a) i, ii and iii      (b) i, iii and iv      (c) i, ii and iv      (d) ii, iii and iv
12. Offspring formed by sexual reproduction exhibit more variation than those formed by asexual reproduction because
- Sexual reproduction is a lengthy process.
  - Gametes of parents have qualitatively different genetic composition.
  - Genetic material comes from parents of two different genetic compositions.
  - Greater amount of DNA is involved in sexual reproduction.
13. Choose the correct statement from amongst the following:
- Dioecious (hermaphrodite) organisms are seen only in animals.
  - Dioecious organisms are seen only in plants.
  - Dioecious organisms are seen in both plants and animals.
  - Dioecious organisms are seen only in vertebrates.
14. There is no natural death in single celled organisms like Amoeba and bacteria because
- They cannot reproduce sexually.
  - They reproduce by binary fission.
  - Parental body is distributed among the offspring.
  - They are microscopic.
15. There are various types of reproduction. The type of reproduction adopted by an organism depends on
- The habitat and morphology of the organism.
  - Morphology of the organism.
  - Morphology and physiology of the organism.
  - The organism's habitat, physiology and genetic makeup.
16. Identify the incorrect statement.
- In asexual reproduction, the offspring produced are morphologically and genetically identical to the parent.
  - Zoospores are sexual reproductive structures.
  - In asexual reproduction, a single parent produces offspring with or without the formation of gametes.
  - Conidia are asexual structures in structures.
17. Which of the following is a post-fertilization event in flowering plants?
- Transfer of pollen grains      (b) Embryo development
  - Formation of flower      (c) Formation of pollen grains
18. The number of chromosomes in the shoot tip cells of a maize plant is 20. The number of chromosomes in the microspore mother cells of the same plant shall be
- 20      (b) 10      (c) 40      (d) 15

**Answer Keys***Practice Questions*

1. (c) 2. (d) 3. (a) 4. (c) 5. (b) 6. (c) 7. (d) 8. (d) 9. (d) 10. (b)  
11. (c) 12. (d) 13. (d) 14. (c) 15. (b) 16. (a) 17. (c) 18. (d) 19. (c) 20. (b)  
21. (b) 22. (c) 23. (a) 24. (d) 25. (b) 26. (b) 27. (d) 28. (a) 29. (d) 30. (c)  
31. (a) 32. (c) 33. (b) 34. (d) 35. (d) 36. (d) 37. (d) 38. (d) 39. (b) 40. (b)  
41. (a) 42. (b) 43. (b) 44. (b) 45. (a) 46. (b) 47. (c) 48. (c) 49. (c) 50. (d)  
51. (d) 52. (a) 53. (d) 54. (d) 55. (d) 56. (c) 57. (a) 58. (b) 59. (c) 60. (d)  
61. (a) 62. (d) 63. (d) 64. (b) 65. (c) 66. (a) 67. (d) 68. (d) 69. (b) 70. (d)  
71. (d) 72. (d) 73. (d) 74. (d) 75. (b) 76. (a) 77. (d) 78. (d) 79. (c) 80. (d)  
81. (d) 82. (d) 83. (a) 84. (b) 85. (c) 86. (c) 87. (a) 88. (c) 89. (a) 90. (d)  
91. (b) 92. (c) 93. (c) 94. (d) 95. (c) 96. (c) 97. (c) 98. (d) 99. (a) 100. (b)

*Assertion and Reason Questions*

101. (b) 102. (a) 103. (a) 104. (b) 105. (d) 106. (c) 107. (d) 108. (a) 109. (a) 110. (d)  
111. (a) 112. (b) 113. (c) 114. (a) 115. (a) 116. (d) 117. (b) 118. (d) 119. (d)

*Previous Year Questions*

1. (c) 2. (c) 3. (b) 4. (b) 5. (a) 6. (c) 7. (a) 8. (d) 9. (c) 10. (a)  
11. (b) 12. (a) 13. (d) 14. (b)

*NCERT Exemplar Questions*

1. (c) 2. (a) 3. (c) 4. (b) 5. (d) 6. (c) 7. (b) 8. (a) 9. (b) 10. (b)  
11. (c) 12. (b) 13. (c) 14. (c) 15. (d) 16. (b) 17. (b) 18. (a)

*This page is intentionally left blank.*

## CHAPTER

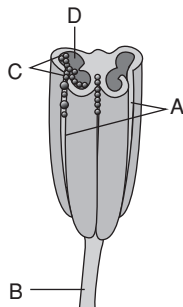
# 2

# Sexual Reproduction in Flowering Plant

### PRACTICE QUESTIONS

#### Flower

- Flowers convey important human feelings such as
  - Love and affection
  - Happiness and grief
  - Mourning
  - All of these
- Flowers are considered as objects of
  - Aesthetic value
  - Ornamental value
  - Religious and cultural value
  - All of these
- Biologists consider flowers to be objects of
  - Morphological marvels
  - Embryological marvels
  - Sites of sexual reproduction
  - All of these
- When does plant decides to flower?
  - In embryonic development
  - During the appearance of flower buds
  - Before the actual flower appear on plant
  - All the above
- Identify A, B, C and D in this figure?

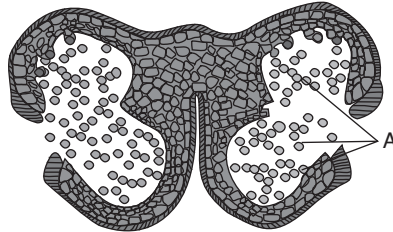


- A: Pollen grains, B: Filament (Stalk), C: Line of dehiscence, D: Pollen sacs
- A: Line of dehiscence, B: Filament (Stalk), C: Pollen sacs, D: Pollen grains
- A: Filament (Stalk), B: Pollen grains, C: Line of dehiscence, D: Pollen sacs
- A: Line of dehiscence, B: Pollen sacs, C: Pollen grains, D: Filament (Stalk)



**Fertilisation: Structures and Events**

6. The initiation and development of floral primordium takes place by  
 (a) Only by hormonal changes in plant  
 (b) Only structural changes in plant  
 (c) Changes in seasonal variation  
 (d) Both by hormonal and structural changes in plant
7. Whorl of stamens in flower represents  
 (a) Gynoecium  
 (b) Androecium  
 (c) Calyx  
 (d) Corolla
8. Whorl of carpel in flower represents  
 (a) Gynoecium  
 (b) Androecium  
 (c) Calyx  
 (d) Corolla
9. What indicates 'A' in the below figure?



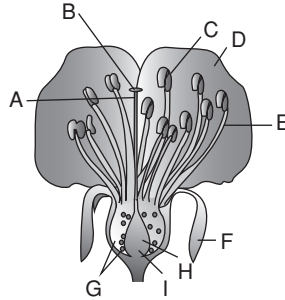
- (a) Pollen grains  
 (b) Pollen sacs  
 (c) Generative cell  
 (d) Vacuoles
10. Whorl of petals in flower represents  
 (a) Gynoecium  
 (b) Androecium  
 (c) Calyx  
 (d) Corolla
11. Whorl of sepals in flower represents  
 (a) Androecium  
 (b) Gynoecium  
 (c) Calyx  
 (d) Corolla
12. Stamens consists of which of the following parts?  
 (a) Filament  
 (b) Style, stigma  
 (c) Anther  
 (d) Both (a) and (c)
13. The number and length of stamens in flowers are  
 (a) Variable in different species.  
 (b) Same in plants present in similar climatic condition.  
 (c) Variable and dependent on the amount of hormonal secretion.  
 (d) Variable in different species and depend on the seasonal variation.
14. Typical angiosperm anther is  
 (a) Unilobed and ditheous  
 (b) Bilobed and ditheous  
 (c) May be both (a) and (b)  
 (d) Bilobed and tetratheous
15. The anther in transverse section appears to be  
 (a) Diagonal  
 (b) Tetragonal  
 (c) Unilobed  
 (d) Mosaic

16. What are A, B, C and D in this figure?

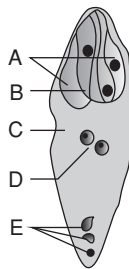


- (a) A: Thalamus, B: Style, C: Ovary, D: Stigma  
 (b) A: Style, B: Ovary, C: Stigma, D: Thalamus  
 (c) A: Stigma, B: Style, C: Ovary, D: Thalamus  
 (d) A: Ovary, B: Stigma, C: Thalamus, D: Style
17. Tetragonal anther consists of  
 (a) One microsporangia (b) Two microsporangia  
 (c) Three microsporangia (d) Four microsporangia
18. How many microsporangia are there in each lobe of anther?  
 (a) One microsporangia (b) Two microsporangia  
 (c) Three microsporangia (d) Four microsporangia
19. Pollen sacs develop from  
 (a) Microspore (b) Microspore mother cell  
 (c) Microsporangium (d) Megaspore
20. Typical microsporangium appear \_\_\_\_\_ in transverse section.  
 (a) Wavy (b) Circular  
 (c) Oval (d) Irregular
21. Which one amongst the given perform the function of protection in typical microsporangium?  
 (A) Epidermis (B) Endothecium  
 (C) Tapetum (D) Middle layer  
 (a) A and B (b) A and C  
 (c) A and D (d) A, B and D
22. Which of the following layer of microsporangium provides nourishment to the developing anther?  
 (a) Middle layers (b) Tapetum  
 (c) Endothecium (d) Epidermis
23. Function performed by the outer three layers of microsporangium?  
 (a) Protection to developing pollen  
 (b) Provides nourishment to developing pollen  
 (c) Helps in the dehiscence of anther to release pollen  
 (d) Both (a) and (c)

24. Identify the parts A to I in this figure.



- (a) A: Ovary, B: Anther, C: Filament, D: Nectariferous area, E: Sepal, F: Stigma, G: Style, H: Ovule, I: Petal
  - (b) A: Anther, B: Ovule, C: Stigma, D: Anther, E: Petal, F: Filament, G: Sepal, H: Nectariferous area, I: Ovary
  - (c) A: Ovary, B: Ovule, C: Nectariferous area, D: Sepal, E: Filament, F: Petal, G: Anther, H: Stigma, I: Style
  - (d) A: Style, B: Stigma, C: Anther, D: Petal, E: Filament, F: Sepal, G: Nectariferous area, H: Ovule, I: Ovary
25. The microsporangium cells which possess dense cytoplasm and have more than one nucleus is the characteristic of
- (a) Middle layers
  - (b) Tapetum
  - (c) Endothecium
  - (d) Epidermis
26. In young anther the tissue occupying the centre of each microsporangium is called
- (a) Megaspore mother cell
  - (b) Sporogenous tissue
  - (c) Parietal tissue
  - (d) None of these
27. Identify A to E in this figure?

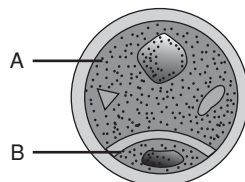


- (a) A: Synergids, B: Egg, C: Central cell, D: 2 polar nuclei, E: Antipodals
  - (b) A: Antipodals, B: Synergids, C: Central cell, D: Egg, E: 2 polar nuclei
  - (c) A: Synergids, B: Central cell, C: 2 polar nuclei, D: Antipodals, E: Egg
  - (d) A: Egg, B: 2 polar nuclei, C: Antipodals, D: Central cell, E: Synergids
28. Arrange the following layers of microsporangium according to their presence from inside to outside.
- (A) Endothecium
  - (B) Middle layer
  - (C) Tapetum
  - (D) Epidermis
- (a) A, B, C, D
  - (b) B, A, C, D
  - (c) D, C, B, A
  - (d) C, B, A, D

29. Sporogenous tissue of microsporangia is  
 (a) Groups of compactly arranges homogenous cells  
 (b) Occupies the centre of microsporangium  
 (c) Present inside young anther  
 (d) All the above
30. Each cell of microspore tetrad is  
 (a)  $2n$  (b)  $n$   
 (c) Some  $n$  and some  $2n$  (d)  $3n$
31. Which type of cell division occurs in the cell of sporogenous tissue to form microspore?  
 (a) Reduction division (b) Equational division  
 (c) Both (a) and (b) (d) Amitosis
32. Formation of pollen from pollen mother cell is referred to as  
 (a) Pollenogenesis (b) Megasporogenesis  
 (c) Microsporogenesis (d) Ovulation
33. Pollen grains are  
 (a) Microspore tetrad (b) Dehydrated microspores  
 (c) Megaspore tetrad (d) Pollen mother cells
34. Male gametophyte in angiosperm is represented by  
 (a) Anther (b) Androecium  
 (c) Microsporangium (d) Pollen grain
35. Pollen grains are  
 (a) Spherical (b) Oval  
 (c) Generally spherical (d) Irregular
36. Diameter of pollen grain is  
 (a)  $20-50\ \mu\text{m}$  (b)  $25-50\ \mu\text{m}$  (c)  $30-50\ \mu\text{m}$  (d)  $10-50\ \mu\text{m}$
37. Exine of pollen is  
 (A) Hard outer layer of pollen grain  
 (B) Most resistant organic matter known.  
 (C) Layer made up of sporopollenin.  
 (D) Layer which can withstand high temperature, strong acids and alkali.  
 (E) Layer which cannot be degraded by any known enzyme.

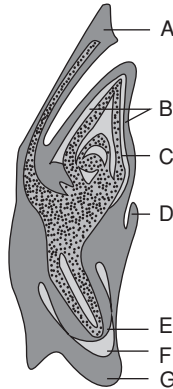
Which one of the following is correct?

- (a) A and B (b) A, B, C and D  
 (c) A, B, C, D and E (d) A, C and E
38. What are the parts A and B in this figure?



- (a) A: Generative cell, B: Vegetative cell  
 (c) A: Vegetative cell, B: Generative cell
- (b) A: Tapetal cell, B: Generative cell  
 (d) A: Homogenous cell, B: Tapetal cell
39. Sporopollenin is  
 (a) Most resistant organic matter known  
 (c) Absent in the germ pole of pollen grain
- (b) Present in exine of pollen grain  
 (d) All of these
40. Pollen grains can be preserved as fossil because  
 (a) They vary from species to species  
 (b) They have variety of architecture  
 (c) They are made up of sporopollenin  
 (d) They exhibit a fascinating array of pattern and design
41. Which part of pollen exhibit a fascination array of pattern and design?  
 (a) Intine  
 (c) Germ pore
- (b) Exine  
 (d) None of these
42. Intine of pollen grain is  
 (a) Inner layer of pollen grain  
 (c) Made up of cellulose and pectin
- (b) A thin and continuous layer  
 (d) All of these

**Figure based questions 43 to 47.**



43. What does 'A' indicate in this figure?  
 (a) Scutellum  
 (c) Radicle
- (b) Shoot apex  
 (d) Coleorhiza
44. What 'C' is showing in the given figure?  
 (a) Epiblast  
 (c) Shoot apex
- (b) Scutellum  
 (d) Radicle
45. Identify the part 'D'.  
 (a) Radicle  
 (c) Coleorhiza
- (b) Root cap  
 (d) Epiblast
46. What is 'G' in the given figure?  
 (a) Scutellum  
 (c) Coleoptile
- (b) Coleorhiza  
 (d) Shoot apex

47. What is 'B' in the given figure?  
 (a) Scutellum (b) Coleorhiza  
 (c) Coleoptile (d) Shoot apex
48. Pollen grains are mature when  
 (a) It contains vegetative and generative cell  
 (b) It contains only single haploid cell  
 (c) Contains two haploid cell  
 (d) Both (a) and (c)
49. Thin and continuous layer of pollen made up of cellulose and pectin  
 (a) Intine (b) Exine  
 (c) Germ pore (d) None of these
50. Pollen grains are shed in 2 celled stage in  
 (a) > 90% Angiosperm plant (b) < 50% Angiosperm plant  
 (c) > 60% Angiosperm plant (d) < 40% Angiosperm plant
51. Generate cell floats in the cytoplasm of  
 (a) Vegetative cell (b) Microspore mother cell  
 (c) Pollen mother cell (d) Megasporangium
52. The below figure represents



- (a) Self-pollinated flowers (b) Cross-pollinated flowers  
 (c) Chasmogamous (d) None of these
53. The bigger cell that receives abundant food and has irregularly shaped nucleus is called  
 (a) Generative cell (b) Vegetative cell  
 (c) Germ cell (d) Sperm cell
54. The spindle-shaped cell with dense cytoplasm and nucleus in pollen grain is called  
 (a) Vegetative cell (b) Generative cell  
 (c) Sperm cell (d) Egg cell
55. Match the following

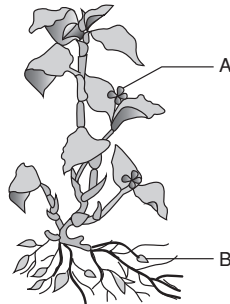
| Column – I         | Column – II                                  |
|--------------------|--|
| A. Vegetative cell | 1. Sporopollenin                             |
| B. Generative cell | 2. Spindle-shaped cell                       |
| C. Exine           | 3. Large sized and has abundant food reserve |
| D. Intine          | 4. Cellulose and pectin                      |

- (a) A:1, B:2, C:3, D:4  
(b) A:4, B:3, C:2, D:1  
(c) A:3, B:2, C:1, D:4  
(d) A:2, B:1, C:4, D:3
56. Male gametes in angiosperms are formed by  
(a) Mitotic division in vegetative cell  
(b) Meiotic division in pollen mother cell  
(c) Meiotic division in vegetative cell  
(d) Mitotic division in generative cell
57. The pollen grains are shed in 3 celled stage in  
(a) > 60% Angiospermic plant  
(b) > 70% Angiospermic plant  
(c) < 40% Angiospermic plant  
(d) < 20% Angiospermic plant
58. Which of the following statement is correct?  
(A) Pollen grains are shed in 2-celled stage in > 40% plants.  
(B) Pollen grains are shed in 3-celled stage in < 60% plant.  
(C) Generative cell divides meiotically to form male gametes.  
(D) Intine of pollen is made up of sporopollenin.  
(a) A, B, C  
(b) All are correct  
(c) All are wrong  
(d) Only C
59. The plant which came in India as a contaminant with imported wheat is?  
(a) Vinca  
(b) Parthenium  
(c) Striga  
(d) Orobanche
60. The below figure represents



- (a) Self-pollinated flowers  
(b) Cross-pollinated flowers  
(c) Cleistogamous flowers  
(d) None of these
61. Which one of the following is incorrect?  
(A) Parthenium or carrot gases causes pollen allergy.  
(B) Vegetative cell of pollen has abundant food reserve.  
(C) All pollen's cause severe allergies and bronchial afflictions.  
(D) Sporopollenin is the most resistant organic matter known.  
(a) All are correct  
(b) A  
(c) B  
(d) C

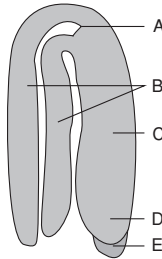
62. What are A and B in this figure?



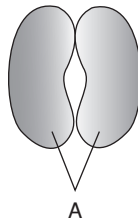
- (a) A: Chasmogamous flower,  
B: Cleistogamous flower
- (b) A: Cleistogamous flower,  
B: Chasmogamous flower
- (c) A: Chasmogamous flower,  
B: Chasmogamous flower
- (d) A: Cleistogamous flower,  
B: Self-pollinated flower
63. Pollen grains
- (A) Represent gametophytic phase of plant  
(B) Can cause severe allergies like asthma and bronchitis  
(C) Are rich in nutrient  
(D) Are used as food supplements  
(E) Are available in form of tables and syrups in market of western countries
- (a) Only A is correct  
(b) All are correct  
(c) All are wrong  
(d) Only A, B and C are correct
64. Viability of pollen grains depend upon
- (a) A particular species  
(b) Prevailing temperature  
(c) Humidity  
(d) All of the above
65. Rice pollen grains are viable for
- (a) 6.0 mins  
(b) 30 mins (approx)  
(c) 60 mins (approx)  
(d) 40 mins
66. Pollens are stored in
- (a) Oxygen ( $-196^{\circ}\text{C}$ )  
(b) Nitrogen ( $-196^{\circ}\text{C}$ )  
(c) Oxygen ( $196^{\circ}\text{C}$ )  
(d) Nitrogen ( $+196^{\circ}\text{C}$ )
67. Syncarpous condition is referred to as
- (a) Gynoecium containing single pistil  
(b) More than one pistil fused together  
(c) More than one pistil free from one another  
(d) Gynoecium containing many pistils



68. Landing platform for pollen grains is  
 (a) Stigma (b) Style  
 (c) Ovary (d) None of them
69. Bulged basal part of pistil is  
 (a) Stigma (b) Style  
 (c) Ovary (d) None of these
70. Elongated slender part of pistil is  
 (a) Stigma (b) Style  
 (c) Ovary (d) None of these
71. Megasporangia is referred to as  
 (a) Ovule (b) Ovary  
 (c) Gynoecium (d) All of these
72. What are parts A to E in this below figure?

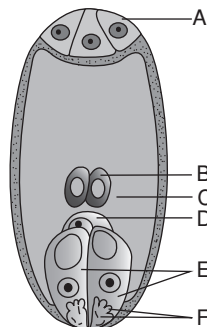


- (a) A: Plumule, B: Cotyledons, C: Hypocotyl, D: Radicle, E: Root cap  
 (b) A: Root cap, B: Hypocotyl, C: Plumule, D: Radicle, E: Cotyledons  
 (c) A: Cotyledons, B: Root cap, C: Cotyledons, D: Plumule, E: Hypocotyl  
 (d) A: Plumule, B: Cotyledons, C: Root cap, D: Radicle, E: Hypocotyl
73. Plants having single ovule in ovary are  
 (a) Wheat (b) Paddy  
 (c) Mango (d) All of these
74. What represents 'A' in the following figure?

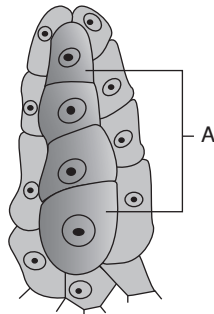


- (a) Cotyledons (b) Scutellum  
 (c) Shoot apex (d) Radicle

75. More than one ovule is found in the ovary of  
 (a) Wheat (b) Paddy (c) Papaya (d) None of these
76. The stalk attaching ovule to placenta is  
 (a) Funiculus (b) Hilum (c) Raphe (d) Chalaza
77. The junction between ovule and funiculus is  
 (a) Placenta (b) Hilum (c) Raphe (d) Chalaza
78. The tips on the ovule where integument are absent are called  
 (a) Germ pore (b) Micropyle (c) Both (a) and (b) (d) None of these
79. The end opposite to micropyles end is called  
 (a) Funicle (b) Chalaza (c) Germ pore (d) Hilum
80. The mass of cell present inside the integuments of megasporangium having abundant food reserve is  
 (a) Ovule (b) Nucellus  
 (c) Sporogenous cells (d) None of these
81. Female gametophyte of angiosperm is referred to as  
 (a) Megasporangium (b) Megaspore  
 (c) Embryo sac (d) Nucleus
82. Embryo sac is formed by  
 (a) Reduction division in megaspore  
 (b) Equational division in megaspore  
 (c) Reduction division followed by equational division in megaspore mother cell  
 (d) Both (b) and (c)
83. How many embryo sacs are present in an ovule?  
 (a) One embryo sac (b) More than one embryo sac  
 (c) One embryo sac (generally) (d) Two embryo sacs
84. What is functional megaspore referred to as?  
 (a) The megaspore that degenerates after formation.  
 (b) The megaspore that only develops in female gametophyte.  
 (c) The megaspore that undergoes reduction division.  
 (d) The megaspore that is functionally inactive.
85. Identify the parts of A to F in the following figure?

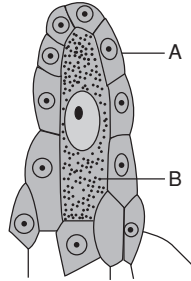


- (a) A: Filiform apparatus, B: Polar nuclei, C: Antipodals, D: Synergids, E: Egg, F: Central cell  
 (b) A: Antipodals, B: Polar nuclei, C: Central cell, D: Egg, E: Synergids, F: Filiform apparatus  
 (c) A: Antipodals, B: Central cell, C: Polar nuclei, D: Egg, F: Synergids, G: Filiform apparatus  
 (d) A: Eggs, B: Central cell, C: Filiform apparatus, D: Polar nuclei, E: Antipodals, F: Synergids
86. Monosporic development is referred to as  
 (a) Single megaspore developing in the embryo sac  
 (b) Single megaspore mother cell undergoing meiosis  
 (c) Presence of single ovule in ovary  
 (d) None of them is correct
87. What is the ploidy level of nucleus, MMC, functional megaspore and female gametophyte?  
 (a)  $2n, n, 2n, 2n$  (b)  $2n, n, 2n, n$   
 (c)  $2n, 2n, n, n$  (d)  $n, 2n, n, n$
88. How many mitotic division takes place for complete development of embryo sac?  
 (a) 4 (b) 3 (c) 2 (d) 1
89. The inside three mitotic division which occurs in the megaspore are  
 (a) Followed by cytoplasmic division immediately.  
 (b) Strictly free nuclear not immediately followed by cell wall formation.  
 (c) Wall formation occurs after the completion of the second mitosis.  
 (d) Wall formation will never occur.
90. Typical female gametophyte is  
 (a) 7-celled 8 nucleate (b) 6-celled 8 nucleate  
 (c) 4-celled 6 nucleate (d) 5-celled 6 nucleate
91. What is 'A' in this figure?



- (a) Megaspore mother cell (b) Megaspore tetrad  
 (c) Embryo sac (d) Micropyle
92. Egg apparatus consists of  
 (a) Two synergids (b) Two antipodals  
 (c) Egg cell (d) Both (a) and (c)
93. The cellular thickening at the tip of micropyle is  
 (a) Synergids (b) Egg apparatus  
 (c) Filiform apparatus (d) All of these

94. The cells located at chalazal ends are called as  
 (a) Synergids (b) Antipodals  
 (c) Egg apparatus (d) None of these
95. Identify the parts A and B in this figure.

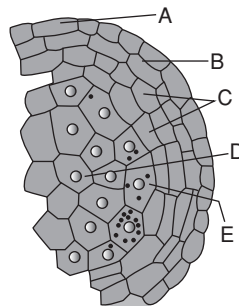


- (a) A: Megaspore tetrad, B: Nucleus (b) A: Central cell, B: Megaspore dyad  
 (c) A: Nucellus, B: Megaspore mother cell (d) A: Nucellus, B: Central cell
96. The central cell  
 (a) Contains two haploid nuclei (b) Has two polar nuclei  
 (c) Located in the centre of embryo sac (d) All of these
97. The cells in embryo sac located at the micropyles end are  
 (a) Egg apparatus (b) Only synergid  
 (c) Antipodal cell (d) Central cell
98. The male and female gametes of angiosperm are respectively  
 (a) Motile, non-motile (b) Non-motile, motile  
 (c) Motile, motile (d) Non-motile, non-motile
99. After three meiotic divisions in the functional megaspore, the gametophyte (embryosac) has how many cells.  
 (a) 7 cells (b) 4 cells (c) 5 cells (d) 8 cells
100. Pollination is essential in angiosperm plants because  
 (a) It decreases the time required for fertilization.  
 (b) Both of the male and female gametes are non-motile and they need to be brought together for fertilization.  
 (c) It is a useless process  
 (d) Both (a) and (b)

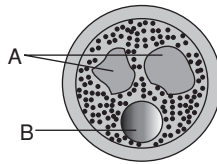
101. The below figure represents



- (a) Anther  
(b) Typical stamen  
(c) Pollen grain  
(d) Microsporangium
102. Pollination in plants is referred to as  
(a) Fusion of male and female gametes.  
(b) Transfer of pollen grain to stigma of pistil.  
(c) Germination of pollen of stigma.  
(d) Production of pollen grew inside the microsporangium.
103. Autogamy refers to  
(a) Transfer of pollen grain to stigma of another flower  
(b) Transfer of pollen grain to stigma of same flower  
(c) Both (a) and (B)  
(d) None of these
104. What is observed in a normal flower which opens and exposes the stigma and anther?  
(a) Autogamy is absent  
(b) Complete autogamy is rare  
(c) Always autogamous  
(d) Always xenogamous
105. Plants which produce two types of flowers are  
(a) Viola  
(b) Oxalis  
(c) Commelina  
(d) All of these
106. The two types of flowers found in autogamous plant is  
(a) Flower similar to flowers of other species with exposed anthers and stigma.  
(b) Flowers which do not open at all.  
(c) Both (a) and (b)  
(d) Flowers with only stigma and no anther.
107. \_\_\_\_\_ flowers produce assured seed set even in the absence of pollinators  
(a) Cleistogamous flower  
(b) Chasmogamous flowers  
(c) Both (a) and (b)  
(d) Flowers showing geitonogamy
108. A type of cross pollination involving a pollinating agent is genetically similar to autogamy since pollen grain come from same plant, it is called  
(a) Xenogamy  
(b) Geitonogamy  
(c) Autogamy  
(d) All of these
109. What are the parts A, B, C, D and E in the below figure?

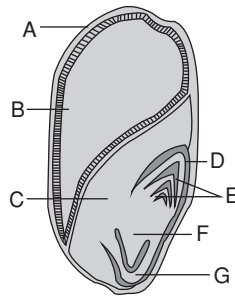


- (a) A: Tapetum, B: Middle layers, C: Microspore mother cells, D: Endothecium, E: Epidermis  
 (b) A: Middle layers, B: Endothecium, C: Tapetum, D: Epidermis, E: Microspore mother cell  
 (c) A: Endothecium, B: Epidermis, C: Tapetum, D: Endothecium, E: Microspore mother cell  
 (d) A: Epidermis, B: Endothecium, C: Middle layers, D: Microspore mother cells, E: Tapetum
110. The only type of pollination during which pollination brings genetically different types of pollen grains to stigma  
 (a) Xenogamy (b) Geitonogamy  
 (c) Autogamy (d) All of these
111. Majority of plants uses which types of pollinating agents?  
 (a) Biotic (b) Abiotic  
 (c) Both (a) and (b) (d) None of these
112. What are A and B in the following figure?



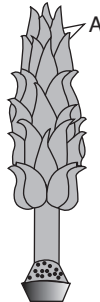
- (a) A: Vacuoles, B: Intine (b) A: Vacuoles, B: Nucleus  
 (c) A: Nucleus, B: Intine (d) A: Exine, B: Intine
113. \_\_\_\_\_ proportion of plants uses abiotic agents for pollination.  
 (a) Major (b) Most  
 (c) Small (d) Can be small or major
114. \_\_\_\_\_ factor is responsible for the contact of pollen with stigma in wind and water pollinated plants.  
 (a) Luck (b) Chance (c) Time (d) Temperature
115. Enormous amount of pollens are produced in wind and water pollinated plants  
 (a) To compensate for uncertainties for contact of pollen with stigma.  
 (b) To compensate for loss of pollen grains.  
 (c) To ensure pollination for large number of ovules present.  
 (d) Both (a) and (b)
116. Most of the common abiotic pollinating agent for plant is  
 (a) Anemophily (b) Hydrophily  
 (c) Pollination by bees (d) Pollination by ants
117. Light and non-sticky pollen grains are favourable for  
 (a) Water pollinated plant (b) Wind pollinated plant  
 (c) Plants with fatherly sigma (d) Both (a) and (c)
118. Which of the following are true for wind pollinated plants?  
 (A) Well exposed statements  
 (B) Large and often feathery stigma  
 (C) Single ovule in each ovary  
 (D) Large number of flower packed into an inflorescence

- (a) Only A  
(c) Only C
- (b) Only B and C  
(d) All are correct
119. Wind pollinated flowers have  
(a) Single ovule in one ovary  
(c) Been packed into an inflorescence
- (b) More than one ovule in ovary  
(d) Both (a) and (c)
120. The tassels of corn cob are  
(a) Stigma and style  
(c) Both (a) and (b)
- (b) Meant to trap pollen grains in wind  
(d) All are incorrect
121. Wind pollination is commonly found in  
(a) Large trees  
(c) Grasses
- (b) Shrubs  
(d) All of these
122. Identify A to G in this figure.



- (a) A: Plumule, B: Endosperm, C: Pericarp, D: Radicle, E: Coleorhiza, F: Scutellum, G: Coleoptile  
(b) A: Coleorhiza, B: Radicle, C: Endosperm, D: Pericarp, E: Plumule, F: Coleoptile, G: Scutellum  
(c) A: Pericarp, B: Scutellum, C: Endosperm, D: Coleoptile, E: Plumule, F: Coleorhiza, G: Radicle  
(d) A: Pericarp, B: Endosperm, C: Scutellum, D: Coleoptile, E: Plumule, F: Radicle, G: Coleorhiza
123. Pollination by water is  
(a) Rare in flowering plants  
(b) Limited to about 30 genera  
(c) Most of the genera are monocotyledons  
(d) All the above
124. Water is the main medium of transport for male gametes of  
(a) Algae                      (b) Bryophytes                      (c) Pteridophyte                      (d) All of these
125. The distribution of pteridophytes and bryophytes is limited to some geographical zones only  
(a) Because their spores can germinate in only specific kind of soil only.  
(b) Because they require water for fertilization.  
(c) Because they have only specific pollination which are available in narrow geographical range.  
(d) Only some weather conditions permit fruit formation in them.

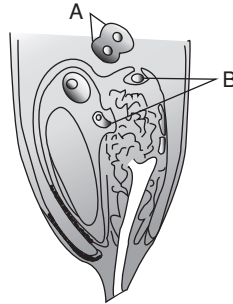
126. What indicates 'A' in the below figure?



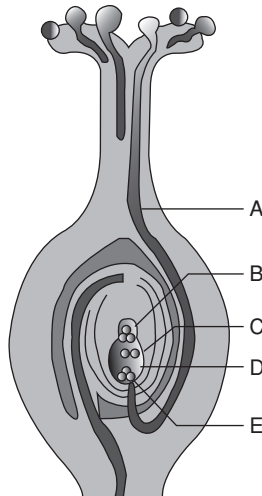
- (a) Pericarp  
(b) Scutellum  
(c) Carpels  
(d) Radicle
127. Which of the following is incorrect for equate plants?  
 (A) Vallisneria and Hydrilla are fresh water plants pollinated by wind.  
 (B) Zostera a marine grass uses water as its pollinating agent.  
 (C) Water hyacinth and water lily are pollinated by insects or wind.  
 (D) Most of the aquatic plant flowers emerges out of water and are pollinated by wind or insects.
- (a) Only B  
(b) Only A  
(c) Only A, B and C  
(d) All are incorrect
128. Which one of the following is correct for aquatic plants?  
 (a) All aquatic plants use water for pollination.  
 (b) Not all aquatic plants use water for pollination.  
 (c) Vallisneria flowers are pollinated by water under the water surface.  
 (d) All the above
129. Which one of the following is correct for Vallisneria?  
 (A) It grows in fresh water.  
 (B) Female flowers or pollen grains reach the surface by long stalk.  
 (C) Male flowers are released on to the surface of water.  
 (D) Pollen grains are carried passively by water currents.
- (a) Only A  
(b) Only A and B  
(c) Only A, B and C  
(d) A, B, C and D
130. In water pollinated species  
 (A) Pollen grains are long and ribbon like  
 (B) All pollen grains are protected from getting wet  
 (C) Flowers are not very colourful  
 (D) They do not produce nectar
- (a) Only A and B are correct  
 (b) Only A and B are wrong  
 (c) All are correct  
 (d) All are wrong



131. Identify A and B in this figure.

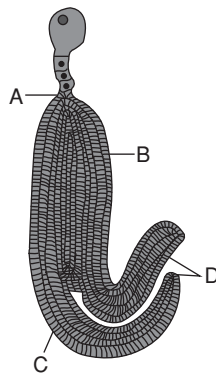


- (a) A: Polar nuclei, B: Male gametes                      (b) A: Female gametes, B: Polar nuclei  
 (c) A: Synergid, B: Egg cell                                (d) A: Male gametes, B: Synergid
132. Amongst the pollinating agent which one is the most dominant?  
 (a) Butterflies and flies                                      (b) Bees  
 (c) Beetles and wasps                                        (d) Moths and birds
133. Which of the following is correct in reference to animal pollinated plants?  
 (a) Butterflies, flies, beetles, wasps, ants, moths and bats are common pollinating agents.  
 (b) Rodents, lizards and primates are also pollinators in some species.  
 (c) Animal pollinated plants are specifically adapted for particular species.  
 (d) All the above
134. What are the parts A, B, C, D and E in this figure?



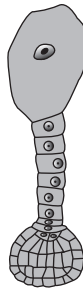
- (a) A: Egg cell, B: Synergid, C: Antipodal, D: Polar nuclei, E: Pollen tube  
 (b) A: Pollen tube, B: Antipodal, C: Polar nuclei, D: Egg cell, E: Synergid  
 (c) A: Pollen tube, B: Egg cell, C: Polar nuclei, D: Antipodal, E: Synergid  
 (d) A: Synergid, B: Pollen tube, C: Egg cell, D: Antipodal, E: Polar nuclei

135. Insect pollinated plants are  
 (a) Large and colourful (b) Fragrant  
 (c) Rich in nectar (d) All of these
136. The foul odour secreted by flowers are pollinated by  
 (a) Flies and beetles (b) Wasps and ants  
 (c) Birds (d) None of these
137. The reward produced by plants to their animal visitors is in the form of  
 (a) Nectar (b) Pollen grain  
 (c) Both (a) and (b) (d) None of these
138. Which one of the following is correct for animal pollinated plants?  
 (a) Nectar and pollen grains are usual floral rewards.  
 (b) To harvest the rewards from the flower, animal come in contact with anther and stigma.  
 (c) Animal carrying pollen when come in contact with stigma, it brings about pollination.  
 (d) All the above
139. Amorphophallus provide floral rewards in the form of  
 (a) Providing safe place to lay eggs  
 (b) Tallest flower  
 (c) Both (a) and (b)  
 (d) None of these
140. Which of the following is correct for the relationship existence between moth and yucca plant?  
 (a) Moth and the plant cannot complete their life cycle without each other.  
 (b) Moth deposits egg in the locule of the ovary and the flower and in turn flower gets pollinated by the moth.  
 (c) Larva of the moth comes out of the eggs as the seeds start developing.  
 (d) All the above
141. What indicates A, B, C and D in the below figure?



- (a) A: Radicle, B: Plumule, C: Cotyledon, D: Suspensor  
 (b) A: Plumule, B: Suspensor, C: Radicle, D: Cotyledon  
 (c) A: Suspensor, B: Radicle, C: Plumule, D: Cotyledon  
 (d) A: Cotyledon, B: Suspensor, C: Cotyledon, D: Radicle

142. Seed is  
 (a) Fertilized ovule  
 (b) Fertilized endosperm  
 (c) Modification of integument  
 (d) Formed from pericarp
143. Typical seed consists of  
 (a) Seed coat  
 (b) Cotyledon  
 (c) Embryo axis  
 (d) All of these
144. All are examples of albuminous seeds except  
 (a) Wheat  
 (b) Sunflower  
 (c) Castor  
 (d) Groundnut
145. The following figure represents



- (a) Globular embryo  
 (b) Heart-shaped embryo  
 (c) Zygote  
 (d) Syngamy
146. Persistent nucleus perisperm is found in  
 (a) Wheat and maize  
 (b) Pea + ground nut  
 (c) Barley and castor  
 (d) Black paper + bect
147. Wheat is the ploidy of perisperm  
 (a) n  
 (b) 2n  
 (c) 3n  
 (d) 4n
148. Select the total number of albuminous seed from the following.  
*Pea, Groundnut, Wheat, Maize, Barely, Castor, Sunflower*  
 (a) 4  
 (b) 5  
 (c) 2  
 (d) 6
149. Mature seed contains how much moisture generally?  
 (a) 10–15% by mass  
 (b) 5–10% by mass  
 (c) 25–30% by mass  
 (d) 40% by mass
150. Select the false statement from the following.  
 (a) Persistent nucleus is the perisperm.  
 (b) Integuments of ovule harden as though protective seed coat.  
 (c) Micropyle remains as a small pore in seed coat and facilitates the entry of oxygen and water into seed during germination.  
 (d) General metabolic activity of embryo is high.
151. The favourable conditions available for germination are  
 (a) Adequate moisture  
 (b) Oxygen  
 (c) Suitable temperature  
 (d) All of these

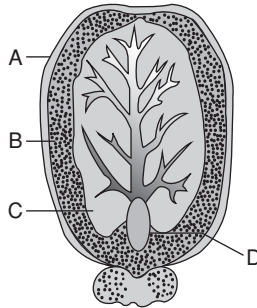
152. Example of false fruit

- (a) Apple (b) Strawberry  
(c) Cashew (d) All of these

153. Thalamus takes part in fruit formation in

- (a) Guava (b) Orange  
(c) Strawberry (d) Mango

154. Identify the parts A, B, C and D in this figure.



- (a) A: Seed coat, B: Endosperm, C: Cotyledon, D: Hypocotyl root axis  
(b) A: Cotyledon, B: Seed coat, C: Hypocotyl root axis, D: Endosperm  
(c) A: Endosperm, B: Cotyledon, C: Seed coat, D: Hypocotyl root axis  
(d) A: Hypocotyl root axis, B: Endosperm, C: Seed coat, D: Cotyledon

155. Which of the following is an example of dry fruit?

- (a) Groundnut (b) Mustard  
(c) Both (a) and (b) (d) Mango

156. Fruit develops from

- (a) Sepals (b) Petals (c) Thalamus (d) Ovary

157. Fruit developed without fertilization is known as

- (a) Parthenocarpy (b) Amphimixis  
(c) Apomixis (d) Polyembryony

158. Which is true about parthenocarpic fruit?

- (a) Seedless (b) Banana is an example  
(c) Can be induced by growth hormones (d) All of these

159. Select the false statement.

- (a) Hard seed coat provides protection to young embryo.  
(b) Generally seed is the product of sexual reproduction, so they generate new genetic combination leading to variation.  
(c) Seeds have better adaptive strategies for dispersal to new habitat and help the species to colonize in other areas.  
(d) Pollination and fertilization in angiosperm depend on water.

160. Which oldest seed is excavated from Arctic Tundra?

- (a) Lupin arcticus (b) Phoenix dactylifera  
(c) Solanum nigrum (d) Raphanus sativus

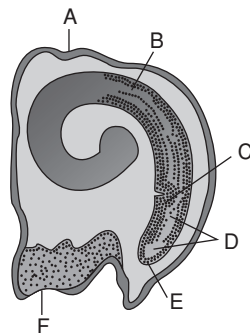
161. *Phoenix dactylifera* is  
 (a) A 2000 year old viable seed  
 (b) A type of date palm  
 (c) Excavated from king Herod's palace near the Dead sea  
 (d) All the above

**Apomixis and Polyembryony**

162. Apomixis is seen in  
 (a) Asteraceae (b) Grasses  
 (c) Both (a) and (b) (d) None of these
163. Apomixis means  
 (a) Fruit without seed (b) Fruit with seed  
 (c) Seed without fertilization (d) Fruit without fertilization
164. Polyembryony is  
 (a) One embryo in one seed (b) More than one embryo in a seed  
 (c) More seed in one embryo (d) Seed development without fertilization
165. Polyembryony is seen in  
 (a) Citrus fruits (b) Coconut  
 (c) Date palm (d) Pineapple
166. Which one of the following is correct for yucca plant?  
 (a) Moth species and yucca plant cannot complete their life cycles without each other.  
 (b) The moth deposits in egg in the locule of ovary of yucca plant.  
 (c) The larva of the moth came out of the eggs as the seed starts developing of yucca  
 (d) All the above
167. The devices developed by plants to discourage self-pollination include  
 (A) In some species, the pollen release and receptive stigma are not synchronized.  
 (B) In some species, the anther and stigma are placed at different positions, so they do not come in contact.  
 (C) Self-incompatibility  
 (a) All are correct (b) A and B only  
 (c) A only (d) B only
168. Dioecy is the mechanism for some plants to  
 (a) Promote autogamy  
 (b) Promote self-fertilization  
 (c) Promote cross pollination  
 (d) All are incorrect
169. In Castor and maize plant, flowers are  
 (a) Unisexual  
 (b) Both male and female flowers on same plants (monoecious)  
 (c) Both male and female flowers on different plants  
 (d) All are incorrect
170. Autogamy and geitonogamy is absent in  
 (a) Papaya (b) Maize (c) Castor (d) All are correct

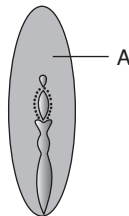
171. The pollen pistil interaction refers to  
 (a) Pistil's ability to recognize the pollen  
 (b) Acceptance of pollen to promote post-pollination events  
 (c) Both are incorrect  
 (d) Both (a) and (b) are correct
172. The acceptance and rejection by continuous dialogue between pollen grain and pistil mediated by chemical components of pollen and pistil result in  
 (a) Autogamy  
 (b) Pollen pistil interaction  
 (c) Geitonogamy  
 (d) Pollination
173. During pollen pistil the interaction chemical components are released from  
 (a) Only pollen  
 (b) Only pistil  
 (c) Both pollen and pistil  
 (d) The ovary
174. What happens when the pollen falls on the stigma?  
 (a) Pollination  
 (b) Reject of pollen  
 (c) Only the compatible pollen germinates  
 (d) Autogamy
175. The pore from which the pollen tube germinates  
 (a) Seed pore  
 (b) Germ pore  
 (c) Intine  
 (d) Exine
176. Which way of pollen to ovary is sequentially correct?  
 (a) Ovary → Style → Stigma  
 (b) Style → Stigma → Ovary  
 (c) Stigma → Ovary → Style  
 (d) Stigma → Style → Ovary

**Figure based Questions 177 to 180.**



177. What indicates 'A' in the above figure?  
 (a) Cotyledon  
 (b) Hypocotyl root axis  
 (c) Seed coat  
 (d) Endosperm
178. What indicates 'C' in the above figure?  
 (a) Shoot apical meristem  
 (b) Root tip  
 (c) Cotyledon  
 (d) Seed coat

179. What indicates 'F' in the above figure?  
 (a) Root tip (b) Shoot apical meristem  
 (c) Cotyledon (d) Endosperm
180. What indicates 'D' in the above figure?  
 (a) Seed coat (b) Cotyledon  
 (c) Shoot apical meristem (d) Hypocotyl root axis
181. During pollination in plants which shed pollens in 2-celled stage, the cells are called as  
 (a) Two vegetative cell (b) Two generative cell  
 (c) Both are correct (d) One vegetative and one generative cell
182. Generative cell in pollen tube divides and forms  
 (a) One male gamete (b) Two male gamete  
 (c) Three male gamete (d) Four male gamete
183. The plants in which pollen are shed in 3-celled stage contain?  
 (a) Two male gametes only (b) A large vegetative cell only  
 (c) Both (a) and (b) (d) None of these
184. What indicates 'A' in the following figure?



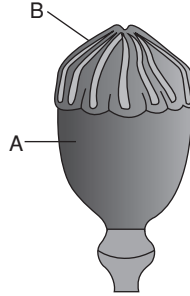
- (a) Micropyle (b) Cotyledon  
 (c) Endosperm (d) Scutellum
185. The pollen tube after reaching the ovary enters inside the ovule generally through which part of ovule?  
 (a) Chalazal end (b) Micropyle end  
 (c) Any of these (d) Integument of ovule
186. The pollen enters one of the synergids through  
 (a) Micropyles end (b) Filiform apparatus  
 (c) Integument (d) Both (a) and (b)
187. The knowledge of pollen pistil interaction is helpful to plant breeders in which manner?  
 (a) Manipulating pollen-pistil interaction  
 (b) To get desired hybrids in incompatible pollination  
 (c) None of them  
 (d) Both (a) and (b) are correct
188. Which one of the following is correct for artificial hybridization?  
 (A) Combine desirable characters to produce superior varieties.  
 (B) Approach towards crop improvement programme.  
 (C) Desired pollen grains are used for pollination.  
 (D) Stigma is exposed to receive pollen.

- (a) All are correct  
(c) Only A and B
- (b) Only A  
(d) Only A, B and C
- 189.** Artificial hybridization is achieved by
- (a) Emasculation  
(c) Both are required
- (b) Bagging  
(d) None of these
- 190.** Emasculation is
- (a) Removal of anther from unisexual flowering using a pair of forceps.  
(b) Removal of anther from flower bud after its dehisces using a pair of forceps.  
(c) Removal of anther from bisexual flower bud before its dehisces using a pair of forceps.  
(d) All the above
- 191.** Emasculated flowers are covered with a bag of suitable size; the process is referred to as
- (a) Emasculation  
(c) Both (a) and (b)
- (b) Bagging  
(d) None of these
- 192.** Why bagging is done in an emasculated flower?
- (a) To prevent contamination of its stigma with unwanted pollen.  
(b) To pollinate the stigma with required anthers only.  
(c) Both (a) and (b)  
(d) None of these
- 193.** Emasculation is not required in flowers with
- (a) Only having pistil (unisexual)  
(c) Having only anthers (unisexual)
- (b) Having both pistil and anthers (bisexual)  
(d) All are correct
- 194.** The female parent plants produce unisexual flowers
- (a) Do not require emasculation  
(c) The flowers are bagged during bud stage
- (b) Requires emasculation  
(d) Both (a) and (c)
- 195.** During syngamy
- (a) Male gamete fuses with two polar nuclear  
(c) Both (a) and (b)
- (b) Male gamete fuses with egg cell  
(d) None of these
- 196.** Primary endosperm nucleus is a result of
- (a) Fusion of two polar nuclei with male gamete  
(b) Fusion of egg cell with male gamete  
(c) Both (a) and (b)  
(d) None of these
- 197.** Triple fusion is a result of
- (a) Fusion of three haploid nuclei  
(b) Fusion of two polar nuclei with male gamete  
(c) Both (a) and (b)  
(d) None of these
- 198.** Double fertilization is
- (A) Unique to flowering plant  
(B) Results in formation of zygote and primary endosperm cell.  
(C) A process in which triple fusion and syngamy takes place.  
(D) A process in which triple fusion only takes place.



- (a) Only A and B  
(b) Only A, B and C  
(c) All are correct  
(d) Only A

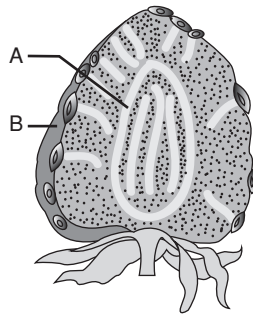
199. Triple fusion results in \_\_\_\_\_ while syngamy results in \_\_\_\_\_.  
(a) Zygote and endosperm  
(b) Endosperm and zygote  
(c) Both form of zygote  
(d) Both fern endosperm
200. Identify A and B in this figure.



- (a) A: Ovary, B: Syncarpous ovary  
(b) A: Filament, B: Ovary  
(c) A: Stigma, B: Filament  
(d) A: Syncarpous ovary, B: Stigma
201. Endosperm is a product of \_\_\_\_\_ and embryo is a product of \_\_\_\_\_.  
(a) Triple fusion, syngamy  
(b) Syngamy, triple fusion  
(c) Syngamy, Syngamy  
(d) Triple fusion, Triple fusion
202. Post-fertilization events do not include  
(A) Formation of primary endosperm cell  
(B) Maturation of ovules in seed  
(C) Formation of ovary into fruit  
(D) Formation of embryo inside seed  
(a) Only A  
(b) Only B  
(c) Only C  
(d) None of these
203. Which of the following precedes the other?  
(a) Development of embryo before endosperm  
(b) Endosperm developing before embryo  
(c) Both the development of embryo and endosperm occurs simultaneously  
(d) All the above
204. Which one of the following is correct for endosperm?  
(a) The cells of this tissue are filled with reserve food material.  
(b) Used for nutrition of developing embryo.  
(c) PEN undergoes nuclear division followed by cytokinesis.  
(d) All the above
205. Endosperm is earlier \_\_\_\_\_ and then develops into \_\_\_\_\_.  
(a) cellular, nuclear  
(b) nuclear, cellular  
(c) cellular, cellular  
(d) nuclear, nuclear
206. The number of nuclei in free nuclear endosperm before cellularization is  
(a) Fixed  
(b) Varies greatly  
(c) Fixed in species  
(d) None of these

207. Coconut water is \_\_\_\_\_ part of endosperm  
(a) Cellular (b) Free nuclear  
(c) Cellular as well as nuclear (d) Neither cellular nor free nuclear
208. White kernel of coconut is which part of endosperm?  
(a) Cellular (b) Free nuclear  
(c) Cellular as well as nuclear (d) Neither cellular nor free nuclear
209. Endosperm is completely consumed during seed formation in  
(a) Pea, castor and coconut (b) Castor and coconut  
(c) Pea and beans (d) Groundnut and castor
210. Endosperm persist in mature seed of  
(a) Pea, castor and coconut (b) Castor and coconut  
(c) Pea and beans (d) Groundnut and castor
211. Development of embryo takes place at  
(a) Chalazal end of embryo sac  
(b) Micropyle end of embryo sac  
(c) Near the integument of embryo sac  
(d) All of these
212. Zygote divides after the formation of endosperm  
(a) To provide assured nutrition to develop the endosperm.  
(b) To provide assured nutrition to develop embryo.  
(c) None of these  
(d) Both (a) and (b)
213. The development of embryo in both monocotyledons and dicotyledons  
(a) Same  
(b) Differ greatly  
(c) Biennials in early staples of development  
(d) Both (b) and (c)
214. Which of the following is correct?  
(a) Proembryo → Mature embryo → Globular embryo  
(b) Proembryo → Globular embryo → Mature embryo  
(c) Globular embryo → Proembryo → Mature embryo  
(d) Mature embryo → Globular embryo → Proembryo
215. The portion of embryo above the cotyledon is called \_\_\_\_\_ and below the cotyledon is called as \_\_\_\_\_  
(a) Epicotyl, hypocotyl (b) Hypocotyl, epicotyl  
(c) Plumule, radical (d) Radical and plumule
216. Epicotyl terminates into  
(a) Stem tip (b) Root tip  
(c) Plumule (d) Both (a) and (c)
217. Hypocotyl terminates into  
(a) Root tip (b) Stem tip  
(c) Plumule (d) Both (a) and (c)

218. Embryo of monocotyledon possess only  
 (a) Two cotyledon (b) One cotyledon  
 (c) Scutellum (d) Both (b) and (c)
219. The root cap of monocot is covered in  
 (a) Coleoptile (b) Coleorhiza  
 (c) Root tip (d) None of these
220. The leaf primordia is enclosed in hollow foliar structure called as  
 (a) Coleoptile (b) Coleorhiza  
 (c) Root tip (d) None of these
221. Identify A and B in this figure.



- (a) A: Thalamus, B: Endocarp (b) A: Thalamus, B: Achene  
 (c) A: Endocarp, B: Mesocarp (d) A: Mesocarp, B: Endocarp

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.  
 (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.  
 (c) If the assertion is true but the reason is false.  
 (d) If both the assertion and reason are false.
222. **Assertion:** Pollen grains are well preserved as fossils.  
**Reason:** Pollen posses sporopollenin.
223. **Assertion:** Pollen tables is used as a food supplement.  
**Reason:** Pollen grains are rich in nutrient.
224. **Assertion:** Pollen tube enters the ovule through micropyle.  
**Reason:** Pollen tube enters in one of the synergids through filiform apparatus.
225. **Assertion:** Coconut water is a cellular endosperm.  
**Reason:** White kernel of coconut is a free nuclear endosperm.

226. **Assertion:** Most of the zygote divides only after certain amount of endosperm is formed.  
**Reason:** This is an adaptation to provide assumed nutrition to the developing embryo.
227. **Assertion:** Embryos of monocotyledons possess only one cotyledon.  
**Reason:** In the grass family the cotyledon is called scutellum.
228. **Assertion:** Parthenocarpic fruits are seedless  
**Reason:** Parthenocarpic fruits develop without fertilization.
229. **Assertion:** Angiosperm can colonize in other areas easily.  
**Reason:** Angiosperms have seeds and seeds have better adoptive strategies for dispersal to new habitats.
230. **Assertion:** Seed is the basic tool for agriculture.  
**Reason:** Dehydration and dormancy of mature seed is not crucial for the storage of seeds.
231. **Assertion:** Polyembryony is found in all angiosperm.  
**Reason:** All angiosperm are produced by apomixis.
232. **Assertion:** Exine of pollen grain is discontinuous layer.  
**Reason:** Exine absent at germ pores.
233. **Assertion:** Pollen grains of some species can cause asthma.  
**Reason:** Pollen grains of some species act as allergens.
234. **Assertion:** Pollen bank can be formed for crop breeding programmes.  
**Reason:** Pollen grain of many species can be stored for year in liquid nitrogen ( $-196^{\circ}\text{C}$ )
235. **Assertion:** Wind pollinated plant have large feathery stigma.  
**Reason:** Feathery stigma easily traps air-borne pollen grains.
236. **Assertion:** Water pollinated species have mucilaginous covering on pollen grains.  
**Reason:** Mucilage covering protect pollen grain from wetting.
237. **Assertion:** Majority of flowering plant have bisexual flower still they show cross pollination.  
**Reason:** Continued self-pollination results in inbreeding depression.
238. **Assertion:** Self incompatibility is genetic mechanism to prevent self pollination.  
**Reason:** It promotes germination of pollen from same plant or same flower on stigma.
239. **Assertion:** Artificial hybridisation requires emasculation in bisexual flower.  
**Reason:** Emasculation is removal another before their dehiscence so it prevent self pollination.
240. **Assertion:** The ploidy of primary endosperm nucleus (PEN) in angiosperm is  $3n$ .  
**Reason:** PEN is formed by triple fusion.
241. **Assertion:** Endosperm development occurs before embryo development.  
**Reason:** Cells of endosperm are filled with reserve food material and act as source of nutrition for developing embryo.

## PREVIOUS YEAR QUESTIONS

1. Apomictic embryos in citrus arise from [AIPMT PRE 2010]
  - (a) Synergids
  - (b) Maternal sporophytic tissue in ovule
  - (c) Antipodal cells
  - (d) Diploid egg
2. Transfer of pollen grains from the anther to the stigma of another flower of the same plant is called [AIPMT PRE 2010]
  - (a) Xenogamy
  - (b) Geitonogamy
  - (c) Karyogamy
  - (d) Autogamy
3. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons? [AIPMT PRE 2010]
  - (a) Cotyledon
  - (b) Endosperm
  - (c) Aleurone layer
  - (d) Plumule
4. Wind pollinated flowers are [AIPMT PRE 2010]
  - (a) Small, brightly coloured, producing large number of pollen grains
  - (b) Small, producing large number of dry pollen grains
  - (c) Large, producing abundant nectar and pollen
  - (d) Small, producing nectar and dry pollen
5. Filliform apparatus is a characteristic feature of [AIPMT PRE 2011]
  - (a) Egg
  - (b) Synergid
  - (c) Zygote
  - (d) Suspensor
6. What would be the number of chromosomes of the aleurone cells of a plant with 42 chromosomes in its root tip cells? [AIPMT PRE 2011]
  - (a) 63
  - (b) 84
  - (c) 21
  - (d) 42
7. Wind pollination is common in [AIPMT PRE 2011]
  - (a) Lilies
  - (b) Grasses
  - (c) Orchids
  - (d) Legumes
8. Nucellar polyembryony is reported in the species of [AIPMT PRE 2011]
  - (a) Gossypium
  - (b) Triticum
  - (c) Brassica
  - (d) Citrus
9. In which one of the following, pollination is autogamous? [AIPMT PRE 2011]
  - (a) Xenogamy
  - (b) Chasmogamy
  - (c) Cleistogamy
  - (d) Geitonogamy

10. In angiosperms, functional megaspore develops into [AIPMT MAINS 2011]  
(a) Embryo sac (b) Ovule  
(c) Endosperm (d) Pollen sac
11. What is common between vegetative reproduction and apomixis? [AIPMT MAINS 2011]  
(a) Both are applicable to only dicot plants  
(b) Both bypass the flowering phase  
(c) Both occur round the year  
(d) Both produce progeny identical to the parent
12. Plants with ovaries having only one or a few ovules are generally pollinated by [AIPMT MAINS 2012]  
(a) Butterflies (b) Birds  
(c) Wind (d) Bees
13. What is the function of germ pore? [AIPMT MAINS 2012]  
(a) Absorption of water for seed germination  
(b) Initiation of pollen tube  
(c) Release of male gametes  
(d) Emergence of radical
14. Which one of the following statements is wrong? [AIPMT MAINS 2012]  
(a) Vegetative cell is larger than generative cell.  
(b) Pollen grains in some plants remain viable for months.  
(c) Intine is made up of cellulose and pectin.  
(d) When pollen is shed at two-celled stage, double fertilization does not take place.
15. An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is [AIPMT PRE 2012]  
(a) Cuticle (b) Sporopollenin  
(c) Lignin (d) Cellulose
16. Even in the absence of pollinating agents seed-setting is assured in [AIPMT PRE 2012]  
(a) Commelina (b) Zostera  
(c) Salvia (d) Fig
17. The coconut water and the edible part of coconut are equivalent to [AIPMT PRE 2012]  
(a) Endosperm (b) Endocarp  
(c) Mesocarp (d) Embryo
18. Both, autogamy and geitonogamy are prevented in [AIPMT PRE 2012]  
(a) Papaya (b) Cucumber  
(c) Castor (d) Maize

19. The gynoecium consists of many free pistils in flowers of [AIPMT PRE 2012]  
(a) Aloe (b) Tomato  
(c) Papaver (d) Michelia
20. Which one of the following statements is correct? [AIPMT 2013]  
(a) Hard outer layer of pollen is called intine.  
(b) Sporogenous tissue is haploid.  
(c) Endothecium produces the microspores.  
(d) Tapetum nourishes the developing pollen.
21. The advantage of cleistogamy is [AIPMT 2013]  
(a) Higher genetic variability (b) More vigorous offspring  
(c) No dependence on pollinators (d) Vivipary
22. Perisperm differs from endosperm in [AIPMT 2013]  
(a) Being a haploid tissue  
(b) Having no reserve food  
(c) Being a diploid tissue  
(d) Its formation by fusion of secondary nucleus with several sperms
23. Geitonogamy involves [AIPMT 2014]  
(a) Fertilization of a flower by the pollen from another flower of the same plant.  
(b) Fertilization of a flower by the pollen from the same flower.  
(c) Fertilization of a flower by the pollen from a flower of another plant in the same population.  
(d) Fertilization of a flower by the pollen from a flower of another plant belonging to a distant population.
24. Male gametophyte with least number of cells is present in [AIPMT 2014]  
(a) Pteris (b) Funaria  
(c) Lilium (d) Pinus
25. Pollen tablets are available in the market for [AIPMT 2014]  
(a) In vitro fertilization (b) Breeding programmes  
(c) Supplementing food (d) Ex situ conservation
26. The function of filiform apparatus is to [AIPMT 2014]  
(a) Recognize the suitable pollen at stigma  
(b) Stimulate division of generative cell  
(c) Produce nectar  
(d) Guide the entry of pollen tube
27. Non-albuminous seed is produced in [AIPMT 2014]

- (a) Maize (b) Castor  
(c) Wheat (d) Pea
28. Which one of the following may require pollinators, but it is genetically similar to autogamy?  
[AIPMT 2015]  
(a) Geitonogamy (b) Xenogamy  
(c) Apogamy (d) Cleistogamy
29. Which one of the following statements is not true?  
[AIPMT 2015]  
(a) Pollen grains are rich in nutrients and they are used in the form of tablets and syrups.  
(b) Pollen grains of some plants cause severe allergies and bronchial affections in some people.  
(c) The flowers pollinated by flies and bats secrete foul odour to attract them.  
(d) Honey is made by bees by digesting pollen collected from flowers.
30. Transmission tissue is the characteristic feature of  
[AIPMT 2015]  
(a) Hollow style (b) Solid style  
(c) Dry stigma (d) Wet stigma
31. Which of the following are the important floral rewards to the animal pollinators?  
[AIPMT 2015]  
(a) Colour and large size of flower  
(b) Nectar and pollen grains  
(c) Floral fragrance and calcium crystals  
(d) Protein pellicle and stigmatic exudates
32. Male gametophyte in angiosperms produces  
[RE-AIPMT 2015]  
(a) Single sperm and a vegetative cell (b) Single sperm and two vegetative cells  
(c) Three sperms (d) Two sperms and a vegetative cell
33. Coconut water from a tender coconut is  
[RE-AIPMT 2015]  
(a) Free nuclear endosperm (b) Innermost layers of the seed coat  
(c) Degenerated nucellus (d) Immature embryo
34. Which one of the following fruits is parthenocarpic?  
[RE-AIPMT 2015]  
(a) Apple (b) Jackfruit (c) Banana (d) Brinjal
35. Filiform apparatus is characteristic feature of:  
[RE-AIPMT 2015]  
(a) Nucellar embryo (b) Aleurone cell  
(c) Synergids (d) Generative cell
36. In angiosperms, microsporogenesis and megasporogenesis:  
[RE-AIPMT 2015]  
(a) From gametes without further divisions (b) Involve meiosis  
(c) Occur in ovule (d) Occur in anther



37. The correct water from tender coconut represents: [NEET - I, 2016]  
 (a) Endocarp (b) Fleshy mesocarp  
 (c) Free nuclear proembryo (d) Free nuclear endosperm
38. Proximal end of the filament of stamen is attached to the: [NEET - I, 2016]  
 (a) Anther (b) Connective  
 (c) Placenta (d) Thalamus or petal
39. Which one of the following statements is not true? [NEET - I, 2016]  
 (a) Tapetum helps in the dehiscence of anther  
 (b) Exine of pollen grains is made up of sporopollenin  
 (c) Pollen grains of many species cause severe allergies  
 (d) Stored pollen in liquid nitrogen can be used in the crop breeding programmes
40. Seed formation without fertilization in flowering plants involves the process of: [NEET - I, 2016]  
 (a) Sporulation (b) Budding  
 (c) Somatic hybridization (d) Apomixis
41. Which of the following statements is not correct? [NEET - I, 2016]  
 (a) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style  
 (b) Insects that consume pollen or nectar without bringing about pollination are called pollen nectar robbers  
 (c) Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil  
 (d) Some reptiles have also been reported as pollinators in some plant species
42. Which one of the following generate new genetic combinations leading to variation? [NEET - II, 2016]  
 (a) Parthenogenesis (b) Sexual reproduction  
 (c) Nucellar polyembryony (d) Vegetative reproduction
43. Match Column – I with Column – II and select the correct option using the codes given below: [NEET - II, 2016]
- | Column – I                      | Column – II            |
|---------------------------------|------------------------|
| A. Pistils fused together       | 1. Gametogenesis       |
| B. Formation of gametes         | 2. Pistillate          |
| C. Hyphae of higher ascomycetes | 3. Syncarpous          |
| D. Unisexual female flower      | 4. Dikaryotic          |
| (a) A:2, B:1, C:4, D:3          | (b) A:1, B:2, C:4, D:2 |
| (c) A:3, B:1, C:4, D:2          | (d) A:4, B:3, C:1, D:2 |
44. In majority of angiosperms [NEET - II, 2016]  
 (a) There are numerous antipodal cells  
 (b) Reduction division occurs in the megaspore mother cells  
 (c) A small central cell is present in the embryo sac  
 (d) Egg has a filiform apparatus
45. Pollination in water hyacinth and water lily is brought about by the agency of [NEET - II, 2016]

- (a) Insects or wind      (b) Birds      (c) Bats      (d) Water
46. The ovule of an angiosperm is technically equivalent to \_\_\_\_\_ [NEET - II, 2016]  
(a) Megasporophyll      (b) Megaspore mother cell  
(c) Megaspore      (d) Megasporangium

---

**NCERT EXEMPLAR QUESTIONS**

---

1. Among the terms listed below, the below options which are not technically correct names for a floral whorl are  
i. Androecium      ii. Carpel  
iii. Corolla      iv. Sepal  
(a) i and iv      (b) iii and iv      (c) ii and iv      (d) i and ii
2. Embryo sac is to ovule as \_\_\_\_\_ is to an anther.  
(a) Stamen      (b) Filament      (c) Pollen grain      (d) Androecium
3. In a typical, complete, bisexual and hypogynous flower, the arrangement of floral whorls on the thalamus from the outermost to the innermost is  
(a) Calyx, corolla, androecium and gynoecium  
(b) Calyx, corolla, gynoecium and androecium  
(c) Gynoecium, androecium, corolla and calyx  
(d) Androecium, gynoecium, corolla and calyx
4. A dicotyledonous plant bears flowers but never produces fruits and seeds. The most probable cause for the above situation is  
(a) The plant is dioecious and bears only pistillate flowers  
(b) The plant is dioecious and bears both pistillate and staminate flowers  
(c) The plant is monoecious.  
(d) The plant is dioecious and bears only staminate flowers.
5. The outermost and innermost wall layers of microsporangium in an anther are respectively  
(a) Endothecium and tapetum      (b) Epidermis and endodermis  
(c) Epidermis and middle layer      (d) Epidermis and tapetum
6. During microsporogenesis, meiosis occurs in  
(a) Endothecium      (b) Microspore mother cells  
(c) Microspore tetrads      (d) Pollen grains
7. From among the sets of terms given below, identify those that are associated with the gynoecium.  
(a) Stigma, ovule, embryo sac, placenta      (b) Thalamus, pistil, style, ovule  
(c) Ovule, ovary, embryo sac, tapetum      (d) Ovule, stamen, ovary, embryo sac
8. Starting from the innermost part, the correct sequence of parts in an ovule are  
(a) Egg, nucellus, embryo sac, integument  
(b) Egg, embryo sac, nucellus, integument  
(c) Embryo sac, nucellus, integument, egg  
(d) Egg, integument, embryo sac, nucellus

9. From the statements given below, choose the options that are true for a typical female gametophyte of a flowering plant.
- It is 8-nucleate and 7-celled at maturity.
  - It is free-nuclear during the development.
  - It is situated inside the integument but outside the nucellus.
  - It has an egg apparatus situated at the chalazal end.
- Choose the correct answer from the options given below:
- |                   |                    |
|-------------------|--------------------|
| (a) i, ii and iii | (b) i, iii and iv  |
| (c) i, ii, and iv | (d) ii, iii and iv |
10. Autogamy can occur in a chasmogamous flower if
- Pollen matures before the maturity of ovule.
  - Ovules mature before the maturity of pollen.
  - Both pollen and ovules mature simultaneously.
  - Both anther and stigma are of equal lengths.
11. Choose the correct statement from the following:
- Cleistogamous flowers always exhibit autogamy.
  - Chasmogamous flowers always exhibit geitonogamy.
  - Cleistogamous flowers exhibit both autogamy and geitonogamy.
  - Chasmogamous flowers never exhibit autogamy.
12. A particular species of plant produces light; non-sticky pollen in large numbers and its stigma are long and feathery. These modifications facilitate pollination by
- |             |           |          |             |
|-------------|-----------|----------|-------------|
| (a) Insects | (b) Water | (c) Wind | (d) Animals |
|-------------|-----------|----------|-------------|
13. From among the situations given below, choose the one that prevents both autogamy and geitonogamy.
- Monoecious plant bearing unisexual flowers.
  - Dioecious plant bearing only male or female flowers.
  - Monoecious plant with bisexual flowers.
  - Dioecious plant with bisexual flowers.
14. In a fertilized embryo sac, the haploid, diploid and triploid structures are
- Synergid, zygote and primary endosperm nucleus.
  - Synergid, antipodal and polar nuclei.
  - Antipodal, synergid and primary endosperm nucleus.
  - Synergid, polar nuclei and zygote.
15. In an embryo sac, the cells that degenerate after fertilization are
- Synergid and primary endosperm nucleus cell
  - Synergid and antipodal
  - Antipodal and primary endosperm nucleus cell
  - Egg and antipodals
16. While planning for an artificial hybridization programme involving dioecious plants, which of the following steps would not be relevant?
- |                              |                                 |
|------------------------------|---------------------------------|
| (a) Bagging of female flower | (b) Dusting of pollen on stigma |
| (c) Emasculation             | (d) Collection of pollen        |

17. In the embryos of a typical dicot and a glass, the true homologous structures are  
 (a) Coleorhiza and coleoptiles (b) Coleoptile and scutellum  
 (c) Cotyledons and scutellum (d) Hypocotyl and radical
18. The phenomenon observed in some plants wherein the parts of the sexual apparatus used for forming embryos without fertilization is called  
 (a) Parthenocarpy (b) Apomixis  
 (c) Vegetative propagation (d) Sexual reproduction
19. In a flower, if the megaspore mother cell forms megaspores without undergoing meiosis and if one of the megaspores develops into an embryo sac, its nuclei would be  
 (a) Haploid (b) Diploid  
 (c) A few haploid and a few diploid (d) With varying ploidy
20. The phenomenon wherein, the ovary develops into a fruit without fertilization is called  
 (a) Parthenocarpy (b) Apomixis  
 (c) Asexual reproduction (d) Sexual reproduction

### Answer Keys

#### Practice Questions

1. (d) 2. (d) 3. (d) 4. (c) 5. (b) 6. (d) 7. (b) 8. (a) 9. (a) 10. (d)  
 11. (c) 12. (d) 13. (a) 14. (b) 15. (b) 16. (c) 17. (d) 18. (b) 19. (c) 20. (b)  
 21. (d) 22. (b) 23. (d) 24. (d) 25. (b) 26. (b) 27. (a) 28. (d) 29. (d) 30. (b)  
 31. (a) 32. (c) 33. (b) 34. (d) 35. (c) 36. (b) 37. (c) 38. (c) 39. (d) 40. (c)  
 41. (b) 42. (d) 43. (a) 44. (c) 45. (d) 46. (b) 47. (c) 48. (d) 49. (a) 50. (c)  
 51. (a) 52. (a) 53. (b) 54. (b) 55. (c) 56. (d) 57. (c) 58. (c) 59. (b) 60. (b)  
 61. (d) 62. (a) 63. (b) 64. (d) 65. (b) 66. (b) 67. (b) 68. (a) 69. (c) 70. (b)  
 71. (a) 72. (a) 73. (d) 74. (a) 75. (c) 76. (a) 77. (b) 78. (b) 79. (b) 80. (b)  
 81. (c) 82. (d) 83. (c) 84. (b) 85. (b) 86. (a) 87. (c) 88. (b) 89. (b) 90. (a)  
 91. (b) 92. (d) 93. (c) 94. (b) 95. (c) 96. (d) 97. (a) 98. (d) 99. (a) 100. (b)  
 101. (b) 102. (b) 103. (b) 104. (b) 105. (d) 106. (c) 107. (a) 108. (b) 109. (d) 110. (a)  
 111. (a) 112. (b) 113. (c) 114. (b) 115. (d) 116. (a) 117. (b) 118. (d) 119. (d) 120. (c)  
 121. (c) 122. (d) 123. (d) 124. (d) 125. (b) 126. (c) 127. (b) 128. (b) 129. (d) 130. (c)  
 131. (a) 132. (b) 133. (d) 134. (b) 135. (d) 136. (a) 137. (c) 138. (d) 139. (a) 140. (d)  
 141. (c) 142. (a) 143. (d) 144. (d) 145. (a) 146. (d) 147. (b) 148. (b) 149. (a) 150. (d)  
 151. (d) 152. (d) 153. (c) 154. (a) 155. (c) 156. (d) 157. (a) 158. (d) 159. (d) 160. (a)  
 161. (d) 162. (c) 163. (c) 164. (b) 165. (a) 166. (d) 167. (a) 168. (c) 169. (b) 170. (a)  
 171. (d) 172. (b) 173. (c) 174. (c) 175. (b) 176. (d) 177. (c) 178. (a) 179. (d) 180. (d)  
 181. (d) 182. (b) 183. (c) 184. (a) 185. (b) 186. (b) 187. (d) 188. (d) 189. (c) 190. (c)  
 191. (b) 192. (c) 193. (a) 194. (d) 195. (b) 196. (a) 197. (c) 198. (b) 199. (b) 200. (d)  
 201. (a) 202. (a) 203. (b) 204. (d) 205. (b) 206. (b) 207. (b) 208. (a) 209. (c) 210. (b)  
 211. (b) 212. (b) 213. (d) 214. (b) 215. (a) 216. (d) 217. (a) 218. (b) 219. (b) 220. (a)  
 221. (b)

*Assertion and Reason Questions*

222. (a) 223. (a) 224. (b) 225. (d) 226. (a) 227. (b) 228. (a) 229. (a) 230. (c) 231. (d)  
232. (a) 233. (a) 234. (a) 235. (a) 236. (a) 237. (a) 238. (c) 239. (a) 240. (a) 241. (a)

*Previous Year Questions*

1. (b) 2. (b) 3. (a) 4. (b) 5. (b) 6. (a) 7. (b) 8. (d) 9. (c) 10. (a)  
11. (d) 12. (c) 13. (b) 14. (d) 15. (b) 16. (a) 17. (a) 18. (a) 19. (d) 20. (d)  
21. (c) 22. (c) 23. (a) 24. (c) 25. (c) 26. (d) 27. (d) 28. (a) 29. (d) 30. (b)  
31. (b) 32. (d) 33. (a) 34. (c) 35. (c) 36. (b) 37. (d) 38. (d) 39. (a) 40. (d)  
41. (a) 42. (b) 43. (c) 44. (b) 45. (a) 46. (d)

*NCERT Exemplar Questions*

1. (c) 2. (c) 3. (a) 4. (d) 5. (d) 6. (b) 7. (a) 8. (b) 9. (c) 10. (c)  
11. (a) 12. (c) 13. (b) 14. (a) 15. (b) 16. (c) 17. (c) 18. (b) 19. (b) 20. (a)

## CHAPTER

# 3

# Human Reproduction

### PRACTICE QUESTIONS

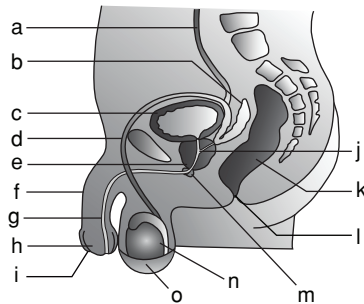
- Humans are \_\_\_\_ and \_\_\_\_ organisms.  
(a) Sexually reproducing, oviparous  
(b) Asexually reproducing, ovoviviparous  
(c) Asexually reproducing, viviparous  
(d) Sexually reproducing, viviparous
- The formation of gametes is termed as  
(a) Gametogamy  
(b) Syngamy  
(c) Gametogenesis  
(d) Gestation
- The transfer of sperms into the female genital tract is called  
(a) Insemination  
(b) Gametogenesis  
(c) Fertilization  
(d) Gestation
- The fusion of male and female gametes is known as  
(a) Insemination  
(b) Fertilization  
(c) Implantation  
(d) Parturition
- Match the following correctly.

| Column-I         | Column-II                            |
|------------------|--------------------------------------|
| 1. Gestation     | A. Fusion of male and female gametes |
| 2. Parturition   | B. Formation of gametes              |
| 3. Gametogenesis | C. Attachment to the uterine wall    |
| 4. Implantation  | D. Delivery of the baby              |
|                  | E. Embryonic development             |

- (a) 1:A, 2:C, 3:B, 4:D  
(b) 1:E, 2:D, 3:A, 4:C  
(c) 1:E, 2:D, 3:B, 4:C  
(d) 1:C, 2:D, 3:A, 4:C
- The correct chronological order of the following events is  
(a) Gametogenesis → Fertilization → Insemination → Gestation → Implantation → Parturition  
(b) Gametogenesis → Insemination → Fertilization → Implantation → Parturition → Gestation  
(c) Gametogenesis → Insemination → Fertilization → Implantation → Gestation → Parturition  
(d) None of these

7. The following statements are true except
- In an individual, reproductive changes occur after puberty.
  - Sperm formation occurs even in old men.
  - Formation of ovum continues in women after fifty years.
  - Humans are sexually producing and viviparous.
8. The testes are situated \_\_\_\_ the abdominal cavity within a pouch called \_\_\_\_.
- inside, testicular lobules
  - outside, scrotum
  - outside, vas deferens
  - inside, scrotum
9. The scrotum helps in maintaining a temperature \_\_\_\_ lower than the internal body temperature.
- 1 to 1.5°C
  - 2 to 2.5°C
  - 3 to 3.5°C
  - 4 to 4.5°C
10. An adult testes is oval in shape. Its width is about \_\_\_\_ and length is about \_\_\_\_ respectively.
- 4 to 5 cm, 2 to 3 cm
  - 2 to 5 cm, 1 to 3 cm
  - 2 to 3 cm, 4 to 5 cm
  - 2 to 5 cm, 4 to 7 cm

**Figure given for questions 11 to 15.**



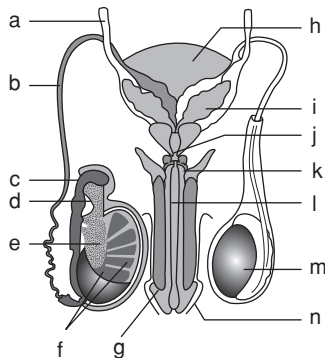
11. What does 'm' represent?
- Ureter
  - Ejaculatory duct
  - Bulbourethral gland
  - Urethra
12. What is indicated by 'd' in the figure?
- Urethra
  - Vas deferens
  - Vasa efferentia
  - Ureter
13. What does 'o' represent in the figure?
- Glans penis
  - Scrotum
  - Testis
  - Epididymis
14. What is indicated by 'h' in the figure?
- Penis
  - Foreskin
  - Glans penis
  - Urethral meatus
15. What is indicated by 'b' in the figure?
- Prostate gland
  - Bulbourethral gland
  - Ureter
  - Seminal vesicle

16. An adult testes bears \_\_\_\_ compartments called testicular lobules.  
 (a) 150 (b) 250 (c) 350 (d) 500
17. Each testicular lobule contains \_\_\_\_ seminiferous tubule.  
 (a) Only three (b) Only one  
 (c) One to three (d) More than three

**Gametogenesis**

18. Male germ cells are known as  
 (a) Sperms (b) Spermatogonia  
 (c) Spermatid (d) Sertoli cells
19. Seminiferous tubules contain \_\_\_\_ cells for providing nutrition to sperm cells.  
 (a) Leydig cells (b) Interstitial cell  
 (c) Sertoli cells (d) Germ cells
20. The cells which secrete androgens are  
 (a) Spermatozoa (b) Interstitial cells  
 (c) Sertoli cells (d) Germ cells
21. Select the correct anatomical sequence.  
 (a) Seminiferous tubules → Rete testis → Vasa efferentia → Vasa deferens → Epididymis  
 (b) Seminiferous tubules → Rete testis → Vasa efferentia → Epididymis → Vasa deferens  
 (c) Seminiferous tubules → Vasa efferentia → Rete testis → Vasa deferens → Epididymis  
 (d) None of these
22. The enlarged end of penis is known as  
 (a) Glans (b) Foreskin  
 (c) Urethra (d) Prostate
23. If A stands for seminal vesicles, B stands for bulbourethral glands, C stands for prostate gland, then which of the following is true?  
 (a) A and C occurs in pair (b) A and B occur in pair  
 (c) B and C occur in pair (d) None of these
24. Seminal plasma is rich in which sugar?  
 (a) Sucrose (b) Glucose (c) Fructose (d) Maltose

**Figure given for questions 25 to 30.**

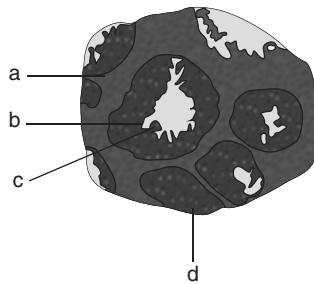




25. What is indicated by 'e' in this figure?  
(a) Testicular lobule (b) Testis  
(c) Vasa efferentia (d) Rete testis
26. What is indicated by 'c' in the figure?  
(a) Vasa efferentia (b) Rete testis  
(c) Epididymis (d) Vas deferens
27. What is indicated by 'i' in the figure?  
(a) Prostate (b) Urinary bladder  
(c) Seminal vesicle (d) Bulbourethral gland
28. What does 'k' represent?  
(a) Prostate (b) Urinary bladder  
(c) Seminal vesicle (d) Bulbourethral gland
29. What is indicated by 'l' in the figure?  
(a) Vas deferens (b) Ureter  
(c) Urethra (d) Ejaculatory duct
30. The secretion of which gland helps in the lubrication of penis?  
(a) Seminal vesicle (b) Prostate  
(c) Bulbourethral (d) Epididymis
31. Which is the primary female sex organ?  
(a) Uterus (b) Ovaries (c) Oviducts (d) Vagina
32. The ovaries are located  
(a) One on each side of the upper abdomen (b) Two on each side of the lower abdomen  
(c) Two on each side of the upper abdomen (d) One on each side of the lower abdomen
33. Which of the following statements about ovary is not true?  
(a) Ovaries are responsible for the production of several steroid hormones.  
(b) Each ovary is about 4 to 6 cm in length.  
(c) Ovary is connected to the pelvic wall.  
(d) Ovary produces female gamete (Ovum).
34. Ovarian stroma is enclosed by \_\_\_\_\_.  
(a) Endothelium (b) Epithelium  
(c) Mesothelium (d) Ciliated epithelium
35. The ovarian stroma is divided into zones  
(a) Peripheral medulla and inner cortex (b) Peripheral epithelia and inner endothelia  
(c) Peripheral cortex and inner medulla (d) Peripheral endothelia and inner epithelia
36. Which one of the following is not an accessory male duct in context of male reproductive system?  
(a) Rete testis (b) Testes  
(c) Epididymis (d) Vas deferens
37. Which one of the following is not a male sex accessory gland?  
(a) Seminal vesicle (b) Epididymis  
(c) Prostate (d) bulbourethral

38. The tubes which conducts ovum to the uterus are known as  
 (a) Fallopian tube (b) Oviduct  
 (c) Cervical opening (d) Both (a) and (b)
39. Which one of the following is not a female accessory duct?  
 (a) Vagina (b) Uterus (c) Oviduct (d) Ovary
40. Each oviduct is about \_\_\_\_ long.  
 (a) 5 to 6 mm (b) 10 to 12 cm (c) 10 to 12 mm (d) 5 to 6 cm

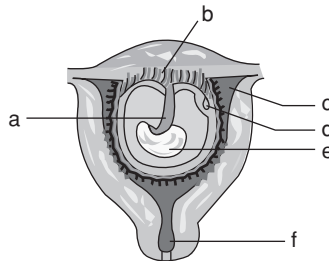
**Figure given for questions 41 to 44.**



41. What is indicated by 'a' in the figure?  
 (a) Sertoli cells (b) Interstitial cells  
 (c) Spermatogonia (d) Spermatozoa
42. What is indicated by 'c' in the figure?  
 (a) Spermatozoa (b) Spermatogonia  
 (c) Interstitial cells (d) Sertoli cells
43. What does 'b' in the figure represent?  
 (a) Interstitial cells (b) Sertoli cells  
 (c) Spermatogonia (d) Spermatozoa
44. What is indicated by 'd' in the figure?  
 (a) Sertoli cells (b) Spermatozoa  
 (c) Spermatogonia (d) Interstitial cells
45. The funnel shaped part of fallopian tube which traps ovum is known as  
 (a) Isthmus (b) Ampulla  
 (c) Infundibulum (d) Cervix
46. Isthmus a part of oviduct, is a narrow lumen and joins \_\_\_\_.  
 (a) Uterus (b) Ampulla  
 (c) Infundibulum (d) Both (a) and (b)
47. The anatomical structure which succeeds infundibulum is  
 (a) Isthmus (b) Ampulla (c) Uterus (d) Ovary
48. Finger-like projection of infundibulum are known as  
 (a) Cilia (b) Flagella  
 (c) Fimbriae (d) None

49. Uterus is commonly known as  
 (a) Birth canal (b) Womb  
 (c) Primary female sex organ (d) Female external genitalia
50. The uterus opens into vagina through \_\_\_\_\_.  
 (a) Ampulla (b) Isthmus  
 (c) Cervix (d) Labia minora
51. Birth canal is formed by  
 (a) Cervical canal + Uterus (b) Cervical canal + Vagina  
 (c) Cervical canal + Isthmus (d) Cervical canal + Fallopian tube
52. The wall of uterus is made up of \_\_\_\_ layers of tissue.  
 (a) 2 (b) 3 (c) 1 (d) 4
53. External thin membranous layer of uterus is known as  
 (a) Pleura (b) Pericardium  
 (c) Perimetrium (d) Periosteum
54. Thick muscular layer of \_\_\_\_ muscle constitutes middle layer of uterus.  
 (a) Smooth (b) Striated (c) Intercalated (d) Voluntary

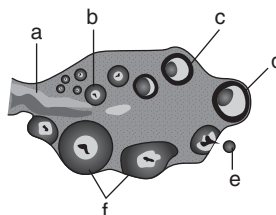
**Figure given for question 55 to 58.**



55. What is indicated by 'e' in the figure?  
 (a) Yolk sac (b) Embryo  
 (c) Cavity of uterus (d) Placental villi
56. What does 'a' represent in the figure?  
 (a) Umbilical cord (b) Embryo  
 (c) Yolk sac (d) Placental villi
57. What does 'd' represent in the figure?  
 (a) Embryo (b) Umbilical cord  
 (c) Yolk sac (d) Cavity of uterus
58. What does 'b' represent in the figure?  
 (a) Cavity of uterus (b) Embryo  
 (c) Yolk sac (d) Placental villi
59. Which layer of uterus undergoes cyclic changes during menstrual cycle?  
 (a) Mesoderm (b) Myometrium  
 (c) Endothelium (d) Endometrium

60. The layer of uterine tissues responsible for strong contractions during childbirth is  
 (a) Perimetrium (b) Mesometrium  
 (c) Mesoderm (d) Myocardium
61. Of the following statements, which one is true for Mons Pubis?  
 (a) It is the region of pubic hair growth found in females as well as males.  
 (b) It is a cushion of proteins covered by skin and pubic hair.  
 (c) It is a cushion of fats covered by skin and pubic hair.  
 (d) It is a part of female internal genitalia.
62. Clitoris lies at the junction of  
 (a) Labia majora (b) Labia minora  
 (c) Mons pubis (d) Pubis symphysis
63. The clitoris is a tiny \_\_\_\_ shaped structure which lies above the urethral opening  
 (a) Flagellated (b) Finger like (c) Bean shaped (d) Pear
64. The only statement correct about hymen is  
 (a) It is an opening of cervix.  
 (b) It is a reliable indicator of virginity.  
 (c) It is always torn after first coitus.  
 (d) It can be broken by a sudden fall or jolt, insertion of vaginal tampon, cycling, etc.
65. Cluster of cells in mammary lobes is known as  
 (a) Mammary duct (b) Alveoli  
 (c) Ampulla (d) Lactiferous duct
66. The terminal structure of the mammary glands through which milk is sucked out is known as  
 (a) Lumen of alveoli (b) Mammary duct  
 (c) Lactiferous duct (d) Mammary lobe
67. Several mammary ducts join to form  
 (a) Mammary lobe (b) Alveoli  
 (c) Mammary ampulla (d) Lactiferous duct
68. Immature male germ cells are known as  
 (a) Spermatid (b) Spermatozoa  
 (c) Spermatogonia (d) Sperm
69. Spermatogonium undergoes \_\_\_\_.  
 (a) Reduction division (b) Meiotic division  
 (c) Mitotic division (d) None of these

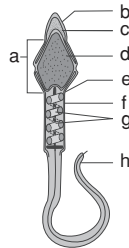
**Figure given for question 70 to 73.**



70. What does 'a' represent in the figure?  
(a) Lymph vessels (b) Blood vessels  
(c) Nerve fibres (d) Ligament
71. What is indicated by 'c' in the figure?  
(a) Primary follicle (b) Second follicle  
(c) Tertiary follicle (d) Graafian follicle
72. What does 'f' represent in the figure?  
(a) Antrum (b) Corpus luteum  
(c) Corpora cavernosa (d) Ovum
73. What does 'e' represent in the figure?  
(a) Ovum (b) Oogonium  
(c) Mature follicle (d) Zona pellucida
74. Each spermatogonium is \_\_\_\_ and has \_\_\_\_ number of chromosomes.  
(a) n, 45 (b) 2n, 23 (c) 2n, 46 (d) n, 46
75. The spermatogonia which undergo meiosis are known as  
(a) Sperm (b) Spermatid  
(c) Secondary spermatocyte (d) Primary spermatocyte
76. The difference between primary and secondary spermatocyte lies in \_\_\_\_.  
(a) Presence/absence of a tail  
(b) Number of chromosomes  
(c) Being hormone producing/non-hormone producing  
(d) Primary gamete/secondary gamete in males
77. Secondary spermatocytes give rise to  
(a) Diploid spermatids (b) Haploid sperm  
(c) Diploid sperm (d) Haploid spermatid
78. Sperms are synonymous with  
(a) Spermatid (b) Spermatogonia  
(c) Primary spermatocyte (d) Spermatozoa
79. Spermiogenesis is  
(a) Transformation of sperm into spermatids.  
(b) Transformation of spermatogonia into primary spermatocyte.  
(c) Transformation of secondary spermatocyte into spermatids.  
(d) Transformation of spermatid into spermatozoa.
80. After spermiogenesis, the sperm head is embedded in the \_\_\_\_ cells.  
(a) Sertoli (b) Leydig (c) Interstitial (d) Both (a) and (b)
81. The release of sperms from seminiferous tubules is known as \_\_\_\_.  
(a) Ejaculation (b) Copulation  
(c) Spermiation (d) None of these
82. Spermatogenesis starts at puberty due to the secretion of  
(a) Luteinizing hormone (b) Gonadotropin releasing hormone  
(c) Follicle stimulating Hormone (d) Testosterone

83. Luteinizing hormone (LH) acts on \_\_\_\_ cells and stimulates synthesis and secretion of \_\_\_\_.
- (a) Leydig cells, FSH (b) Interstitial cells, androgens  
(c) Leydig cells, GnRH (d) None of these
84. Androgens stimulate \_\_\_\_.
- (a) Spermiation (b) Insemination  
(c) Spermatogenesis (d) Oogenesis
85. The function of FSH in male is
- (a) Act on leydig cells and stimulates secretion of factors responsible for spermiation.  
(b) Act on sertoli cells and stimulates secretion of factors responsible for spermatogenesis.  
(c) Act on interstitial cells and stimulates secretion of factors responsible for spermiogenesis.  
(d) Act on sertoli cells and stimulates secretion of factors responsible for spermiogenesis.
86. The microscopic structure of sperm consists of
- (a) Head, Neck, Tail (b) Head, Neck, Middle piece, Tail  
(c) Head, Middle piece, Tail (d) Neck, Middle piece, Tail

**Figure given for question 87 to 90.**



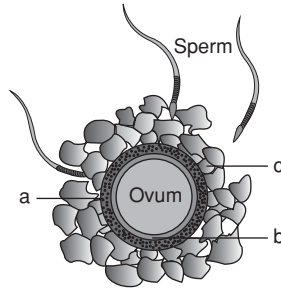
87. What is indicated by 'c' in the figure?
- (a) Ascosome (b) Acrosome  
(c) Nucleosome (d) Hyaluronidase
88. What does 'd' represent in the figure?
- (a) Nucleosome (b) Acrosome  
(c) Nucleus (d) Hyaluronidase
89. What does 'g' represent in the figure?
- (a) Middle piece (b) Mitochondria  
(c) Neck (d) Tail
90. What is indicated by 'b' in the figure?
- (a) Plasma membrane (b) Nuclear membrane  
(c) Acrosome (d) Hyaluronidase
91. The sperm head contains:
- (a) Antherosome (b) Acrosome  
(c) Arthosome (d) Ascosome
92. The function of acrosome is
- (a) Stimulates synthesis of ovum (b) Stimulates release of ovum  
(c) Stimulates fertilization of ovum (d) Stimulates degradation of ovum

93. The middle piece of sperm contains cell organelles like  
(a) Filaments (b) Mitochondria  
(c) Nucleus (d) Ribosomes
94. How many sperm cells are there in an average human ejaculation?  
(a) 200 to 300 billion (b) 200 to 300 million  
(c) 200 to 300 trillion (d) 200 to 300 lacs
95. For a normal male fertility, which of the following statements is correct?  
(a) 60 per cent sperm must have normal motility and 40 per cent must have normal shape.  
(b) 60 per cent sperm must have normal shape and 40 per cent must have acrosome.  
(c) 60 per cent sperm must have normal shape and 40 per cent must have vigorous motility.  
(d) None of these
96. Semen consists of  
(a) Seminal plasma + Spermatid  
(b) Seminal plasma + Spermatozoa  
(c) Seminal plasma + Spermatogonia  
(d) None of these
97. The process of formation of mature female gamete is known as  
(a) Gametogenesis (b) Spermatogenesis  
(c) Oogenesis (d) Morphogenesis
98. Oogenesis initiates after/at  
(a) Fertilization (b) Puberty  
(c) Embryonic development (d) Time of birth
99. Each female ovary consists of  
(a) Millions of ova (b) Millions of primary oocytes  
(c) Millions of oogonia (d) Millions of secondary oocytes
100. The primary oocytes are in which stage of cell division?  
(a) Prophase I of mitotic division  
(b) Prophase I of meiotic division  
(c) Prophase II of meiotic division  
(d) Prophase II of mitotic division
101. From the period of birth till puberty, which cells degenerate in ovary?  
(a) Oogonia (b) Ova  
(c) Secondary follicle (d) Primary follicle
102. The primary and secondary follicle are surrounded by cells known as  
(a) Granulosa (b) Mucosa  
(c) Serosa (d) Granuloma
103. The tertiary follicle in ovary is characterized by the presence of  
(a) Fundus (b) Antrum  
(c) Vacuole (d) Cavity
104. The mature tertiary follicle is also known as  
(a) Ovum (b) Oogonia  
(c) Graafian follicle (d) Polar body

105. The membrane around Graafian follicle is known as

- (a) Zona fasciculata
- (b) Zona reticularis
- (c) Zona externa
- (d) Zona pellucida

**Figure given for question 106 to 108.**



106. What is indicated by 'b' in the figure?

- (a) Ovum
- (b) Cells of corona radiata
- (c) Perivitelline space
- (d) Zona pellucida

107. What does 'a' represent in the figure?

- (a) Cells of corona radiata
- (b) Sperm
- (c) Perivitelline space
- (d) Zona pellucida

108. What does 'c' represent in the figure?

- (a) Cells of corona radiata
- (b) Sperm
- (c) Perivitelline space
- (d) Zona pellucida

109. The Graafian follicles release

- (a) Secondary oocyte
- (b) Primary oocyte
- (c) Ovum
- (d) Both (a) and (b)

110. The release of ovum from ovary is known as

- (a) Ovulation
- (b) Oogenesis
- (c) Parturition
- (d) Gametogenesis

111. Total number of polar bodies formed in oogenesis?

- (a) 2
- (b) 1
- (c) 3
- (d) 0

112. The first menstruation which begins at puberty is called

- (a) Menstrual cycle
- (b) Menarche
- (c) Oogenesis
- (d) Ovulation

113. An average interval of menstrual cycle in females is about \_\_\_\_ days.

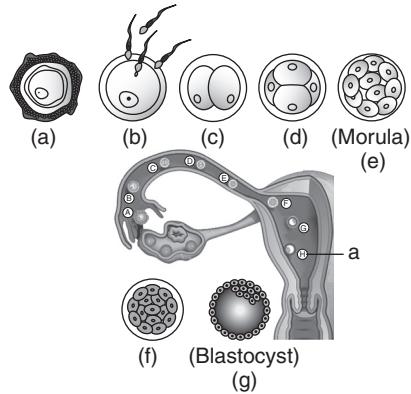
- (a) 15/16
- (b) 30/31
- (c) 28/29
- (d) 25/26

114. One ovum is released during the \_\_\_\_ of each menstrual cycle.

- (a) Initial
- (b) Middle
- (c) Terminal
- (d) Alternative



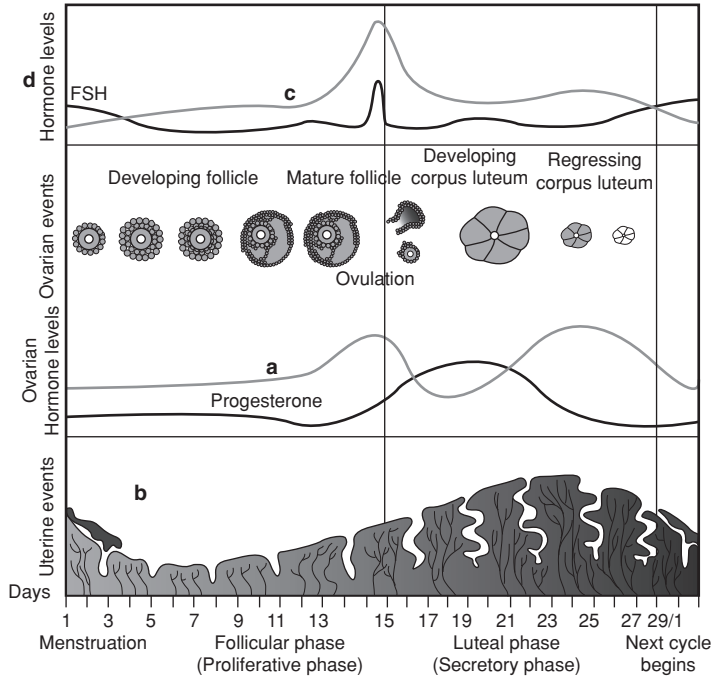
115. What does 'a' represent in this figure?



- (a) Blastocyst  
(b) Blastocyst implantation  
(c) Morula  
(d) Cells
116. The menstrual flow in menstrual cycle lasts for about  
(a) 6 to 7 days  
(b) Almost 7 days  
(c) 3 to 5 days  
(d) 1 to 2 days
117. Lack of menstruation may be indicative of  
(a) Pregnancy  
(b) Routine work stress  
(c) Poor health  
(d) All of these
118. In females, gonadotropins attain a peak level at about \_\_\_\_ day of the menstrual cycle.  
(a) 15th  
(b) 14th  
(c) 28th  
(d) 29th
119. LH surge causes  
(a) Rupture of graafian follicle  
(b) Release of ovum  
(c) Endometrial shedding  
(d) Both (a) and (b)
120. The ovulation phase is followed by \_\_\_\_ phase.  
(a) Gestation  
(b) Luteal  
(c) Menstrual  
(d) Oogenesis
121. After ovulation, Graafian follicle transforms into  
(a) Corpus cavernosa  
(b) Corpus pellucida  
(c) Corpus luteum  
(d) Corpus metrium
122. Large amounts of progesterone is secreted by  
(a) Corpus germinativum  
(b) Corpus luteum  
(c) Corpus cavernosa  
(d) Corpus pellucida
123. If fertilization does not occur corpus luteum \_\_\_\_.  
(a) Proliferates  
(b) Degenerates  
(c) Regenerates  
(d) Divides
124. The stage in human female when menstrual cycle ceases at the age of 50 is known as  
(a) Ovopause  
(b) Menarche  
(c) Menopause  
(d) Menstruation

125. Once the sperm is injected into the female genital tract, which junction is primarily concerned with meeting of sperm with ovum?
- Utero-ampullary junction
  - Ampullary-isthmic junction
  - Isthmic-infundibullary junction
  - Uterine-cervical junction
126. All copulations do not lead to pregnancy. The most appropriate reason to support this statement is
- The ovum and sperm should be transported randomly to ampullary-isthmic junction.
  - The ovum and sperm should be continuously transported to ampullary-isthmic junction.
  - The ovum and sperm should be simultaneously transported to ampullary- isthmic junction.
  - None of these
127. The sperm comes into contact with the \_\_\_\_ layer of ovum to cause fertilization.
- Corona radiata
  - Perivitelline layer
  - Zona pellucida
  - Zona fasciculata
128. Once a sperm fuses with an ovum, the remaining sperms cannot fertilize ovum. What changes are responsible for such phenomenon?
- Selective permeation through ovum.
  - Specific spatial arrangement of corona radiata cells.
  - Change in the membrane zona pellucida.
  - Ovum releases toxic substances thereby killing other sperms.
129. After entry of sperm into cytoplasm of ovum which of the following event takes place?
- Mitotic division of secondary oocyte
  - Meiotic division of primary oocyte
  - Mitotic division of secondary oocyte
  - Meiotic division of secondary oocyte
130. The human female has which of the following sex chromosome pattern?
- |        |         |
|--------|---------|
| (a) XX | (b) YY  |
| (c) XY | (d) YXX |
131. The human male has which of the following sex chromosome pattern?
- |         |        |
|---------|--------|
| (a) YXX | (b) XY |
| (c) XX  | (d) YY |
132. Female produces only
- |                                  |                          |
|----------------------------------|--------------------------|
| (a) One type of gamete Y         | (b) One type of gamete X |
| (c) Either X or Y type of gamete | (d) All of these         |
133. Scientifically, sex of the baby is determined by
- |                             |                       |
|-----------------------------|-----------------------|
| (a) Only mother             | (b) Only father       |
| (c) Either mother or father | (d) Gestational phase |
134. After formation of zygote, it cleaves into 2, 4, 8, 16 daughter cells called
- |                 |                |
|-----------------|----------------|
| (a) Blastocyst  | (b) Morula     |
| (c) Trophoblast | (d) Blastomere |

Figure given for question 135 to 138.

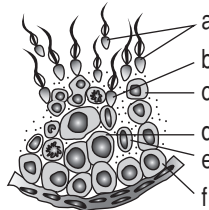


135. What does 'b' represent?
  - (a) LH
  - (b) Pituitary
  - (c) Menses
  - (d) Ovarian
136. What is indicated by 'd' in the figure?
  - (a) Estrogen
  - (b) Pituitary
  - (c) LH
  - (d) Menses
137. What does 'c' represent in the figure?
  - (a) LH
  - (b) Pituitary
  - (c) Menses
  - (d) Ovarian
138. What is indicated by 'a' in the figure?
  - (a) Oestrogen
  - (b) Menses
  - (c) Pituitary
  - (d) Progesterone
139. The embryo with  $2^3$  or  $4^2$  blastomeres is known as
  - (a) Blastocyst
  - (b) Morula
  - (c) Trophoblast
  - (d) Zygote
140. Morula divides and transforms into
  - (a) Inner cell mass
  - (b) Blastocyst
  - (c) Trophoblast
  - (d) Blastomere
141. The outer layer of blastocyst is known as
  - (a) Zona pellucida
  - (b) Trophoblast
  - (c) Blastomere
  - (d) Corona radiata
142. Which layer of blastocyst gets attached to the endometrium during implantation?
  - (a) Trophoblast
  - (b) Blastomere
  - (c) Inner cell mass
  - (d) Morula
143. The inner cell mass of blastocyst develops into
  - (a) Morula
  - (b) Trophoblast
  - (c) Embryo
  - (d) Zygote

144. After implantation the finger-like projection which appears on the trophoblast are known as  
(a) Intestinal villi (b) Ampullary villi  
(c) Chorionic villi (d) Amniotic villi
145. After implantation the finger-like projections on the trophoblast are surrounded by  
(a) Uterine tissue (b) Maternal blood  
(c) Both (a) and (b) (d) Either (a) and (b)
146. The structural and functional unit between the foetus and maternal blood is known as  
(a) Inner cell (b) Placenta  
(c) Trophoblast (d) Chorionic villi
147. Placenta does not perform which of the following function?  
(a) Supply of O<sub>2</sub> (b) Supply of excretory materials  
(c) Supply of nutrients (d) Removal of CO<sub>2</sub>
148. The placenta is connected to embryo through \_\_\_\_ cord.  
(a) Chorionic (b) Umbilical  
(c) Amniocentric (d) Uterine
149. Placenta also acts as a/an \_\_\_\_ tissue.  
(a) Endocrine (b) Exocrine  
(c) Paracrine (d) Mepacrine
150. Which of the following hormone is released by placenta?  
(a) FSH (b) HCG (c) Relaxin (d) LH
151. Relaxin is secreted by  
(a) Ovary (b) Uterus (c) Cervix (d) Oviduct
152. How many germinal layers does embryo consist of initially, after implantation?  
(a) 3 (b) 2 (c) 4 (d) 5
153. In human embryonic development, which layer develops between the ectoderm and endoderm?  
(a) Mesothelium (b) Mesoderm  
(c) Myoderm (d) Myometrium
154. In humans, the inner cell mass (embryo) contains certain cells called \_\_\_\_ cells which have the potential to give rise to all the tissues and organs.  
(a) Root (b) Leaf (c) Stem (d) Seed
155. The average time span of human gestation is  
(a) 8 months (b) 9 months  
(c) 10 months (d) 1 year
156. The pregnancy phase in humans is divided into how many trimesters?  
(a) 2 (b) 4 (c) 3 (d) 5
157. After one month of pregnancy which vital organ is formed in the foetus?  
(a) Brain (b) Heart (c) Lungs (d) Liver
158. In a developing foetus, most of the major organ systems are developed by the end of \_\_\_\_ weeks.  
(a) 14 (b) 12 (c) 10 (d) 16

159. Foetal limbs and digits are formed in the \_\_\_\_ month of embryonic development.  
 (a) 4th (b) 2nd (c) 3rd (d) 7th
160. The second trimester of human pregnancy is characterized by  
 (a) Appearance of heart and aorta  
 (b) Appearance of external genital organs  
 (c) Appearance of fine hair, eye-lashes on the eye-lids  
 (d) Appearance of limbs and digits
161. The scientific name of childbirth is  
 (a) Gestation (b) Parturition  
 (c) Implantation (d) Foetal development
162. During parturition, the mild uterine contractions which lead to expulsion of the foetus is known as  
 (a) Foetal ejection release (b) Foetal ejection reflex  
 (c) Foetal uterine reflex (d) Foetal placental reflex
163. Which hormone is responsible for severe uterine contractions during parturition?  
 (a) Oestrogen (b) Oxytocin  
 (c) Progesterone (d) Relaxin

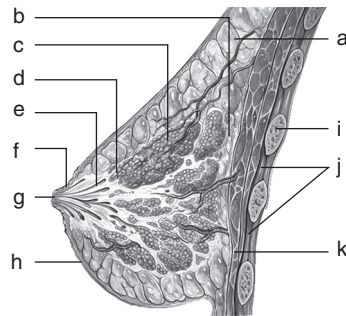
**Figure given for question 164 to 167.**



164. What does 'f' represent in the figure?  
 (a) Sertoli cells (b) Spermatogonium  
 (c) Spermatid (d) Primary spermatocyte
165. What is indicated by 'e' in the figure?  
 (a) Sertoli cells (b) Spermatogonium  
 (c) Spermatid (d) Primary spermatocyte
166. What does 'd' represent in the figure?  
 (a) Sertoli cells (b) Spermatogonium  
 (c) Spermatid (d) Primary spermatocyte
167. What is indicated by 'a' in the figure?  
 (a) Spermatid (b) Spermatozoa  
 (c) Secondary spermatocyte (d) Primary spermatocyte
168. After the delivery of the foetus which of the following structure is also expelled out?  
 (a) Uterus (b) Corpus luteum  
 (c) Placenta (d) Ovary

169. The production of milk in mammary gland occurs  
 (a) During parturition (b) After parturition  
 (c) Before embryogenesis (d) At the end of pregnancy
170. The milk produced during the initial days of lactation is called  
 (a) Menstrum (b) Colostrum  
 (c) Gynostrum (d) None of these
171. The first foetal movement is observed during the \_\_\_\_ month of embryonic development.  
 (a) 4th (b) 5th (c) 3rd (d) 7th
172. Embryos with more than 8 blastomeres could be transferred into the \_\_\_\_.  
 (a) Uterus (b) Fallopian tube  
 (c) Placenta (d) Cervix
173. Transfer of an ovum from a donor to another female who can provide a suitable environment for fertilization is called  
 (a) ZIFT (b) GIFT (c) ICSI (d) IUT
174. Intracytoplasmic sperm injection is a specialized procedure in which the sperm is directly injected into the \_\_\_\_.  
 (a) Ovary (b) Fallopian tube (c) Ovum (d) Uterus
175. In artificial insemination, the semen from husband/healthy donor is artificially introduced into the \_\_\_\_.  
 (a) Vagina (b) Oviduct (c) Uterus (d) Both (a) and (c)

**Figure given for question 176 to 180.**



176. What is indicated by 'h' in the figure?  
 (a) Nipple (b) Areola  
 (c) Laticiferous duct (d) Breast
177. What does 'e' represent in the figure?  
 (a) Laticiferous duct (b) Ampulla  
 (c) Mammary duct (d) Areola
178. What does 'a' represent in the figure ?  
 (a) Mammary alveolus (b) Fat  
 (c) Proteins (d) Laticiferous duct

179. What is indicated by 'j' in the figure?  
(a) Cartilage between ribs (b) Ribs  
(c) Sternum (d) Muscles between ribs
180. What does 'k' represent in the figure?  
(a) Pectoral girdle (b) Rib cage  
(c) Pectoralis major muscle (d) Pectoralis minor muscle
181. In an adult, each testis is \_\_\_\_\_ in shape, with a length of about \_\_\_\_\_ and a width of about \_\_\_\_\_.  
(a) round, 4 to 5 cm, 2 to 3 cm (b) oval, 2 to 3 cm, 4 to 5 cm  
(c) oval, 4 to 5 cm, 2 to 3 cm (d) round, 2 to 3 cm, 4 to 5 cm
182. Each testis has how many testicular tubules?  
(a) 200 (b) 250 (c) 300 (d) 150
183. Male sex accessory ducts include  
(i) Rete testis (ii) Vasa efferentia  
(iii) Epididymis (iv) Vas deferens  
(a) i, ii (b) ii, iii  
(c) i, ii, iii (d) i, ii, iii, iv
184. Which of the following duct stores sperm?  
(a) Vasa efferentia (b) Rete testis  
(c) Epididymis (d) All of these
185. The female reproductive system along with a pair of mammary glands is integrated structurally and functionally to support the process of  
(a) Ovulation and fertilization (b) Pregnancy and birth  
(c) Child care (d) All the above
186. Find out the incorrect statement about ovaries.  
(a) Each ovary is connected to the pelvic wall and uterus by ligaments.  
(b) The ovarian stroma is divided into two zones, i.e., a peripheral cortex and an inner medulla.  
(c) Each ovary is covered by thick epithelium which encloses the ovarian stroma.  
(d) Ovaries are the primary female sex organs.
187. The fallopian tube is about \_\_\_\_\_ long.  
(a) 10 to 12 cm (b) 8 to 10 cm (c) 12 to 14 cm (d) 14 to 16 cm
188. The part of the fallopian tube closer to the ovary is  
(a) Infundibulum (b) Ampulla (c) Isthmus (d) Womb
189. Which facts about the uterus (in human females) is true?  
(a) Single (b) Also called womb  
(c) Inverted pear shape (d) All of these
190. Birth canal is formed by  
(i) Uterus (ii) Cervix  
(iii) Vagina  
(a) i and ii (b) i and iii  
(c) ii and iii (d) iii only

- 191.** Which statement is true about the walls of the uterus?  
(a) It has a thick membranous external wall called the perimetrium.  
(b) It has a thin middle layer of smooth muscles called the myometrium.  
(c) It has an inner glandular layer called the endometrium.  
(d) All are true
- 192.** The endometrium undergoes cyclical changes during the \_\_\_\_ cycle.  
(a) Menstrual            (b) Oestrous            (c) Thermal            (d) None of these
- 193.** The opening of vagina is often covered partially by  
(a) Mons pubis            (b) Labia majora            (c) Labia minora            (d) Hymen
- 194.** Which of the facts is true about clitoris?  
(i) It is a tiny finger-like structure.  
(ii) It lies at the upper junction of two labia minora.  
(iii) It lies at the upper junction of two labia majora.  
(iv) It lies above the uterine opening.  
(v) It lies below the urethral opening.  
(a) i, ii and iii            (b) i, ii and v            (c) i, ii and iv            (d) iii and v
- 195.** Hymen can be torn or broken by  
(i) First coitus  
(ii) Sudden fall or jolt  
(iii) Horse riding  
(iv) Cycling  
(v) Insertion of a vaginal tampon  
(a) i, ii and iv only            (b) iii, iv and v only  
(c) i, iv and v only            (d) All of these
- 196.** Select the true statement.  
(a) Presence of hymen is a reliable indicator of virginity.  
(b) Absence of hymen is a reliable indicator of sexual experience.  
(c) Presence of hymen is a reliable indicator of sexual experience.  
(d) Presence or absence of hymen is not a reliable indicator of virginity.
- 197.** Which is the correct path for the secretion and transport of milk in mammary gland?  
(a) Alveoli → Cavity of alveoli → Mammary tubule → Mammary duct → Mammary ampulla → Lactiferous duct  
(b) Mammary duct → Mammary tubule → Alveoli → Lactiferous duct → Mammary ampulla → Cavity of alveoli  
(c) Mammary duct → Cavity of alveoli → Lactiferous duct → Mammary ampulla → Mammary tubule → Alveoli  
(d) Alveoli → Mammary tubule → Mammary ampulla → Cavity of alveoli → Mammary duct → Lactiferous duct
- 198.** Which fact about the mammary glands in humans is false?  
(a) A non-functional mammary gland is the characteristic of all male mammals.  
(b) Mammary glands are paired structures.  
(c) It is a glandular tissue containing fixed amount of fat.  
(d) Glandular tissue of each breast is divided into 15 to 20 mammary lobes containing clusters of cells called alveoli.



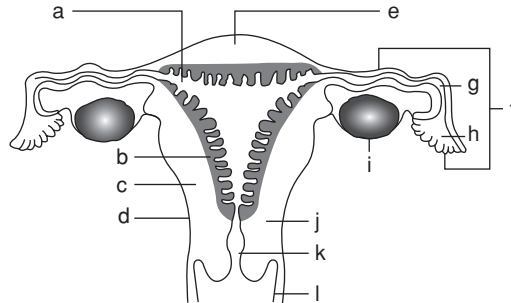
199. Spermatogonia is

- (a) Immature male germ cells  
(b) Mature male germ cells  
(c) Immature male gamete  
(d) Mature male gamete

200. The spermatids are transformed into spermatozoa (sperm) by the process called

- (a) Spermatogenesis  
(b) Spermiogenesis  
(c) Spermiation  
(d) Capacitation

**Figure given for question 201 to 206.**



201. What is indicated by 'j' in the figure?

- (a) Vagina  
(b) Cervical canal  
(c) Cervix  
(d) Myometrium

202. What does 'h' represent in the figure?

- (a) Fimbrial  
(b) Infundibulum  
(c) Isthmus  
(d) Ampulla

203. In the figure, identify the structure 'f' which consists of 'g' and 'h'.

- (a) Ovary  
(b) Fallopian tube  
(c) Uterus  
(d) Cervix

204. What does 'd' represent in the figure?

- (a) Pericardium  
(b) Perimetrium  
(c) Peritoneum  
(d) Epimetrium

205. What is indicated by 'b' in the figure?

- (a) Villi  
(b) Endothelium  
(c) Endometrium  
(d) Epithelium

206. What does 'e' represent in the figure?

- (a) Uterus  
(b) Isthmus  
(c) Uterine fundus  
(d) Uterine ampulla

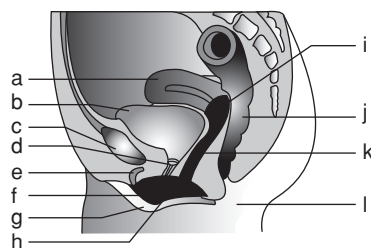
207. Select the correct sequence:

- (a) GnRH → LH → Leydig cells → Androgens → Spermatogenesis  
(b) GnRH → FSH → Sertoli cells → Some factors → Spermiogenesis  
(c) Both are correct  
(d) Both are incorrect

208. Acrosome is a modified  
(a) Golgi body (b) ER  
(c) Vacuole (d) Ribosome
209. Antrum is present in  
(a) Primary follicle (b) Secondary follicle  
(c) Tertiary follicle (d) All of these
210. Primary oocyte grows in size and completes its first meiotic division inside the  
(a) Primary follicle (b) Secondary follicle  
(c) Tertiary follicle (d) All of these
211. Which of the following undergoes unequal division?  
(a) Primary oocyte  
(b) Pollen grain of angiosperm  
(c) Yeast cell during bud formation  
(d) All the above
212. Secondary oocyte develops zona pellucida around it in the \_\_\_\_\_.  
(a) Primary follicle (b) Secondary follicle  
(c) Tertiary follicle (d) Graafian follicle
213. Theca layer is organized into theca interna and externa in which follicle?  
(a) 1° (b) 2°  
(c) 3° (d) Mature follicle
214. How many ovum(s) is/are released in one menstruation?  
(a) 1 (b) 2 (c) 3 (d) 4
215. Which of the facts is true about menstruation?  
(a) It occurs only when the released ovum is not fertilized.  
(b) It occurs due to the breakdown of endometrial lining.  
(c) Menstrual flow lasts for 3 to 5 days.  
(d) All the above
216. Menopausal age in human being is  
(a) 45 years (b) 55 years (c) 50 years (d) 60 years
217. The time required to convert primary follicle into mature follicle is  
(a) 4 days (b) 9 to 11 days (c) 18 to 20 days (d) 2 days
218. Fertilization takes place at  
(a) Isthmus (b) Ampulla  
(c) Infundibulum (d) Ampullary-isthmic junction
219. Which part of the sperm helps in penetration into the ovum?  
(a) Mitochondria (b) Acrosome  
(c) Tail (d) All of these
220. Second meiotic division in secondary oocyte is  
(a) Unequal (b) Complete after sperm penetration  
(c) Both (a) and (b) (d) Equal

221. The embryo with 8 to 16 blastomeres is called  
 (a) Blastula (b) Gastrula  
 (c) Morula (d) None of these
222. Implantation leads to  
 (a) Formation of trophoblast in blastocyst  
 (b) Formation of inner cell mass in blastocyst  
 (c) Pregnancy  
 (d) All the above
223. Which of these hormones is/are produced in women during pregnancy?  
 (a) HCG (b) HPL  
 (c) Relaxin (d) All of these
224. Which of these statements is incorrect about embryo development?  
 (a) After one month of pregnancy the heart is formed.  
 (b) By the end of first trimester most of the major organ systems are formed.  
 (c) First movement of foetus is observed in the seventh month.  
 (d) At the end of second trimester, the body is covered with fine hair, eyelids separate and eye lashes are formed.
225. The process of delivery of foetus is called  
 (a) Parturition (b) Gestation  
 (c) Ejaculation (d) Capacitation
226. Find the false statement.  
 (a) A pair of seminal vesicles is present in human males.  
 (b) A pair of prostates is present in human males.  
 (c) Glans penis is covered by a loose fold of skin called foreskin.  
 (d) Each fallopian tube is about 10 to 12 cm long in a human female.
227. The ploidy of spermatogonia, primary spermatocyte, secondary spermatocyte and spermatid is  
 (a)  $2n, 2n, 2n, n$  (b)  $n, 2n, 2n, n$   
 (c)  $n, 2n, n, n$  (d)  $2n, 2n, n, n$
228. Stem cells which have the potential to produce all types of cells, tissues and organs are present in  
 (a) Ectoderm (b) Inner cell mass  
 (c) Trophoblast (d) Endoderm

**Figure given for question 229 to 233.**



229. What is indicated by 'c' in the figure?  
(a) Urethra (b) Ovary  
(c) Clitoris (d) Public symphysis
230. What does 'f' represent in the figure?  
(a) Clitoris (b) Labia majora  
(c) Labia minora (d) Urethra
231. What is indicated by 'k' in the figure?  
(a) Ovary (b) Cervix (c) Vagina (d) Urethra
232. What is indicated by 'b' in the figure?  
(a) Uterus (b) Vagina  
(c) Public symphysis (d) Urinary bladder
233. What does 'd' represent in the figure?  
(a) Vagina (b) Clitoris (c) Urethra (d) Cervix

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

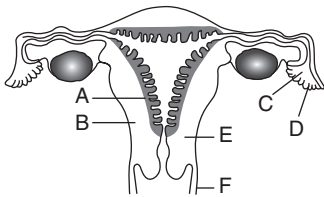
- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.
234. **Assertion:** Testis is situated outside the abdominal cavity with in a pouch called scrotum.  
**Reason:** Scrotum helps in maintaining the low temperature of the testes necessary for spermatogenesis.
235. **Assertion:** Male germ cells undergo mitotic division finally leading to sperm formation.  
**Reason:** Sertoli cells provide nutrition to Leydig cells.
236. **Assertion:** Myometrium undergoes cyclical changes during menstrual cycle.  
**Reason:** Myometrium's lines the uterine cavity
237. **Assertion:** Spermatogonia are haploid cells.  
**Reason:** Spermatogonia multiply by binary fission.
238. **Assertion:** Androgens stimulate the process of spermatogenesis.  
**Reason:** FSH acts on sertoli cells and stimulates the secretion of some factors which helps in the process of spermiogenesis.
239. **Assertion:** Oogenesis is initiated during the embryonic development stage when a couple of million gamete mother cell (oogonia) are formed with in each foetal ovary.  
**Reason:** No more oogonia are formed and added after birth.

- 240. Assertion:** Rupture of Graffian follicle occur before the 14th day of onset of next menstrual cycle.  
**Reason:** LH level is maximum during the mid of cycle, i.e., (14th day).
- 241. Assertion:** Only one sperm can fertilize ovum.  
**Reason:** A sperm when comes in contact with zona pellucida layer of the ovum, some changes occur in membrane that blocks the entry of other sperm.
- 242. Assertion:** In humans the menopause occurs at approximately 50 years of age.  
**Reason:** Cyclic menstruation is an indicator of abnormal reproductive phase.
- 243. Assertion:** Mammary glands differentiate during pregnancy.  
**Reason:** Mammary glands secretes milk after child birth.
- 244. Assertion:** Human are viviparous.  
**Reason:** Human are sexually reproducing organism.
- 245. Assertion:** Proximal end of fallopian tube (infundibulum) possess fimbriae (finger like projection).  
**Reason:** Fimbriae help in catching of ovum after ovulation.
- 246. Assertion:** The presence or absence of hymen is not a reliable indicator of virginity or sexual experience.  
**Reason:** Hymen often torn during first intercourse but it can also be broken by sudden fall, insertion of vaginal tampon, active participation in some sports like horse riding, cycling.
- 247. Assertion:** Reproductive cycle in female primates is called menstrual cycle.  
**Reason:** Menstruation begins at puberty and is known as menarche.
- 248. Assertion:** Lack of menstruation may be indicative of pregnancy in reproductive period of female.  
**Reason:** Menstruation usually occurs if the released ovum is not fertilised.
- 249. Assertion:** Follicular phase is also referred as proliferative phase.  
**Reason:** During follicular phase, the endometrium of uterus regenerates through proliferation.
- 250. Assertion:** Ovulation generally occur during the mid of cycle  
**Reason:** LH surge occur in mid of cycle.
- 251. Assertion:** All copulations not lead to fertilization.  
**Reason:** Fertilization can only if the ovum & sperm are transported simultaneously to the ampullary-isthmic junction.
- 252. Assertion:** Zygote of human contains 46 chromosomes.  
**Reason:** Zygote is formed by fusion of haploid cells namely sperm and ovum.
- 253. Assertion:** Sex of human baby is determined by father not by mother.  
**Reason:** XY sex chromosome is present in human male.
- 254. Assertion:** Doctors use to inject oxytocins to induce delivery.  
**Reason:** Oxytocin causes uterine contraction which helps in delivery.

## PREVIOUS YEAR QUESTIONS

1. Signals from fully developed foetus and placenta ultimately leads to a parturition which requires the release of  
[AIPMT MAINS 2010]
- (a) Oestrogen from placenta
  - (b) Oxytocin from maternal pituitary
  - (c) Oxytocin from foetal pituitary
  - (d) Relaxin from placenta
2. Secretions from which one of the following are rich in fructose, calcium and some enzymes?  
[AIPMT MAINS 2010]
- (a) Male accessory glands
  - (b) Liver
  - (c) Pancreas
  - (d) Salivary glands
3. In human female, the blastocyst  
[AIPMT MAINS 2010]
- (a) Forms placenta even before implantation.
  - (b) Gets implanted into uterus 3 days after ovulation.
  - (c) Gets nutrition from uterine endometrial secretion only after implantation.
  - (d) Gets implanted in endometrium by the trophoblast cells.
4. Seminal plasma in human males is rich in  
[AIPMT PRE 2010]
- (a) Fructose and calcium
  - (b) Glucose and calcium
  - (c) DNA and testosterone
  - (d) Ribose and potassium
5. Sertoli cells are found in  
[AIPMT PRE 2010]
- (a) Ovaries and secrete progesterone
  - (b) Adrenal cortex and secrete adrenalin
  - (c) Seminiferous tubules and provide nutrition to germ cells
  - (d) Pancreas and secrete cholecystokinin
6. Vasa efferentia are the ductules leading from  
[AIPMT PRE 2010]
- (a) Testicular lobules to rete testis
  - (b) Rete testis to vas deferens
  - (c) Vas deferens to epididymis
  - (d) Epididymis to urethra
7. The signals for parturition originate from  
[AIPMT PRE 2010]
- (a) Placenta only
  - (b) Placenta as well as fully developed foetus
  - (c) Oxytocin released from maternal pituitary
  - (d) Fully developed foetus only
8. The first movements of the foetus and appearance of hair on its head are usually observed during which month of pregnancy?  
[AIPMT PRE 2010]
- (a) Fourth month
  - (b) Fifth month
  - (c) Sixth month
  - (d) Third month

9. The second maturation division of the mammalian ovum occurs [AIPMT PRE 2010]
- Shortly after ovulation before the ovum makes entry into the fallopian tube.
  - Until after the ovum has been penetrated by a sperm.
  - Until the nucleus of the sperm has fused with that of the ovum.
  - In the Graafian follicle following the first maturation division.
10. Which one of the following statements about human sperm is correct? [AIPMT PRE 2010]
- Acrosome has a conical pointed structure used for piercing and penetrating the egg, resulting in fertilization.
  - The sperm lysins in the acrosome dissolves the egg envelope facilitating fertilization.
  - Acrosome serves as a sensory structure leading the sperm towards the ovum.
  - Acrosome serves no particular function.
11. Which one of the following statements about morula in humans is correct? [AIPMT PRE 2010]
- It has almost equal quantity of cytoplasm as an uncleaved zygote but much more DNA.
  - It has far less cytoplasm as well as less DNA than in an uncleaved zygote.
  - It has more or less equal quantity of cytoplasm and DNA as in uncleaved zygote.
  - It has more cytoplasm and more DNA than an uncleaved zygote.
12. The part of fallopian tube closest to the ovary is [AIPMT PRE 2010]
- Isthmus
  - Infundibulum
  - Cervix
  - Ampulla
13. The figure given below depicts a diagrammatic sectional view of the female reproductive system of humans. Which one set of three parts out of A to F have been correctly identified?

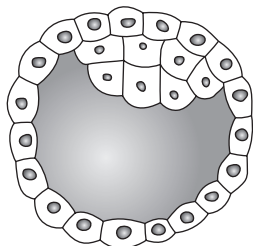


- [AIPMT PRE 2011]
- C - Infundibulum, D - Fimbriae, E - Cervix
  - D - Oviductal funnel, E - Uterus, F - Cervix
  - A - Perimetrium, B - Myometrium, C - Fallopian tube
  - B - Endometrium, C - Infundibulum, D - Fimbriae
14. The testes in humans are situated outside the abdominal cavity inside a pouch called scrotum. The purpose served is for [AIPMT PRE 2011]
- Escaping any possible compression by the visceral organs.
  - Providing more space for the growth of epididymis.
  - Providing a secondary sexual feature for exhibiting the male sex.
  - Maintaining the scrotal temperature lower than the internal body temperature.

15. What happens during fertilization in humans after many sperms reach close to the ovum?  
[AIPMT MAINS 2011]
- Secretions of acrosome helps one sperm enter cytoplasm of ovum through zona pellucida.
  - All sperms except the one nearest to the ovum lose their tails.
  - Cells of corona radiata trap all the sperms except one.
  - Only two sperms nearest to the ovum penetrate zona pellucida.
16. On which day in a normal human menstrual cycle does rapid secretion of LH (popularly called LH surge) normally occurs?  
[AIPMT MAINS 2011]
- 14th day
  - 20th day
  - 5th day
  - 11th day

17. The secretory phase in the human menstrual cycle is also called  
[AIPMT MAINS 2012]
- Follicular phase lasting for about 6 days.
  - Luteal phase and lasts for about 13 days.
  - Follicular phase and lasts for about 13 days.
  - Luteal phase and lasts for about 6 days.

18. Identify the human development stage shown below as well as the related right place of its occurrence in a normal pregnant women and select the right option for the two together:



[AIPMT MAINS 2012]

| <b>Developmental stage</b> | <b>Site of occurrence</b>        |
|----------------------------|----------------------------------|
| (a) Blastula               | End part of fallopian tube       |
| (b) Blastocyst             | Uterine wall                     |
| (c) 8-celled morula        | Starting point of fallopian tube |
| (d) Late morula            | Middle part of fallopian tube    |

19. Which one of the following statements is false with respect to the viability of mammalian sperm?  
[AIPMT PRE 2012]
- Sperm is viable for only up to 24 hours.
  - Survival of sperm depends on the pH of the medium and is more active in alkaline medium.
  - Viability of sperm is determined by its motility.
  - Sperms must be concentrated in a thick suspension.

20. Signals for parturition originates from  
[AIPMT PRE 2012]
- Both placenta as well as fully developed foetus
  - Oxytocin released from maternal pituitary



- (c) Placenta only  
(d) Fully developed foetus only
21. In a normal pregnant woman, the amount of total gonadotropin activity was assessed. The result expected was [AIPMT PRE 2012]
- (a) High level of circulating FSH and LH in the uterus to stimulate implantation of the embryo.  
(b) High level of circulating HCG to stimulate endometrial thickening.  
(c) High level of FSH and LH in uterus to stimulate endometrial thickening.  
(d) High level of circulating HCG to stimulate oestrogen and progesterone synthesis.
22. What is the correct sequence of sperm formation? [AIPMT 2013]
- (a) Spermatid, spermatocyte, spermatogonia, spermatozoa  
(b) Spermatogonia, spermatocyte, spermatozoa  
(c) Spermatogonia, spermatozoa, spermatocyte  
(d) Spermatogonia, spermatocyte, spermatid, spermatozoa
23. Menstrual flow occurs due to the lack of [AIPMT 2013]
- (a) Progesterone  
(b) FSH  
(c) Oxytocin  
(d) Vasopressin
24. Which one of the following is not the function of placenta? [AIPMT 2013]
- (a) Facilitates supply of oxygen and nutrients to embryo.  
(b) Secretes oestrogen.  
(c) Facilitates the removal of carbon dioxide and waste material from embryo.  
(d) Secretes oxytocin during parturition.
25. The shared terminal duct of the reproductive and urinary system in the human male is [AIPMT 2014]
- (a) Urethra (b) Ureter  
(c) Vas deferens (d) Vasa efferentia
26. The main function of mammalian corpus luteum is to produce [AIPMT 2014]
- (a) Oestrogen only (b) Progesterone  
(c) Human chorionic gonadotropin (d) Relaxin only
27. Select the correct option describing gonadotropin activity in a normal pregnant female. [AIPMT 2014]
- (a) High level of FSH and LH stimulates the thickening of endometrium.  
(b) High level of FSH and LH facilitates implantation of the embryo.  
(c) High level of hCG stimulates the synthesis of oestrogen and progesterone.  
(d) High level of hCG stimulates the thickening of endometrium.

28. Capacitation refers to changes in the [AIPMT 2015]
- (a) Sperm before fertilization                      (b) Ovum before fertilization  
(c) Ovum after fertilization                      (d) Sperm after fertilization
29. Which of these is not an important component of initiation of parturition in humans? [AIPMT 2015]
- (a) Increase in oestrogen and progesterone ratio  
(b) Synthesis of prostaglandins  
(c) Release of oxytocin  
(d) Release of prolactin
30. Which of the following cells during gametogenesis is normally diploid? [AIPMT 2015]
- (a) Primary polar body                      (b) Spermatid  
(c) Spermatogonia                      (d) Secondary polar body
31. Hysterectomy is the surgical removal of [AIPMT 2015]
- (a) Uterus                      (b) Prostate gland  
(c) Vas deferens                      (d) Mammary glands
32. Which of the following events is not associated with ovulation in human female? [RE-AIPMT 2015]
- (a) Full development of Graafian follicle                      (b) Release of secondary oocyte  
(c) LH surge                      (d) Decrease in estradiol
33. Ectopic pregnancies are referred to as [RE-AIPMT 2015]
- (a) Implantation of embryo other than uterus  
(b) Implantation of defective embryo in the uterus  
(c) Pregnancies terminated due to hormonal imbalance  
(d) Pregnancies with genetic abnormality
34. Which of the following layers in an antral follicle is acellular? [RE-AIPMT 2015]
- (a) Theca interna                      (b) Stroma  
(c) Zona pellucida                      (d) Granulosa
35. In human female, meiosis-II is not completed until? [RE-AIPMT 2015]
- (a) Fertilization                      (b) Uterine implantation  
(c) Birth                      (d) Puberty
36. Fertilization in humans is practically feasible only if [NEET - I, 2016]
- (a) The sperms are transported into vagina just after the release of ovum in fallopian tube.  
(b) The ovum and sperms are transported simultaneously to ampullary–isthmic junction of the fallopian tube.  
(c) The ovum and sperms are transported simultaneously to ampullary–isthmic junction of the cervix.  
(d) The sperms are transported into cervix within 48 hrs of release of ovum in uterus.

37. Select the incorrect statement: [NEET - I, 2016]
- FSH stimulates the sertoli cells which help in spermiogenesis
  - LH triggers ovulation in ovary
  - LH and FSH decrease gradually during the follicular phase
  - LH triggers secretion of androgens from the Leydig cells
38. Which of the following depicts the correct pathway of transport of sperms? [NEET - II, 2016]
- Rete testis → Epididymis → Efferent ductules → Vas deferens
  - Rete testis → Vas deferens → Efferent ductules → Epididymis
  - Efferent ductules → Rete testis → Vas deferens → Epididymis
  - Rate Testis → Efferent ductules → Epididymis → Vas deferens
39. Match the column- I With Column – II and select the correct option using the codes given below: [NEET - II, 2016]
- | <b>Column – I</b>      | <b>Column – II</b>           |
|------------------------|------------------------------|
| A. Mono pubis          | 1. Embryo formation          |
| B. Antrum              | 2. Sperm                     |
| C. Trophoctoderm       | 3. Female external genitalia |
| D. Nebenkern           | 4. Graafian follicle         |
| (a) A:3, B:4, C:1, D:2 | (b) A:2, B:1, C:4, D:2       |
| (c) A:1, B:4, C:3, D:2 | (d) A:3, B:4, C:2, D:1       |
40. Several hormones like hCG, hPL, estrogen, progesterone are produced by [NEET - II, 2016]
- Placenta
  - Fallopian tube
  - Pituitary
  - Ovary

### NCERT EXEMPLAR QUESTIONS

- Choose the incorrect statement from the following:
  - In birds and mammals internal fertilization takes place.
  - Colostrum contains antibodies and nutrients.
  - Polyspermy in mammals is prevented by the chemical changes in the egg surface.
  - In humans, female implantation occurs almost seven days after fertilization.
- Identify the correct statement from the following:
  - High levels of oestrogen triggers the ovulatory surge.
  - Oogonial cells start to proliferate and give rise to functional ova in regular cycles from puberty onwards.
  - Sperms released from seminiferous tubules are highly motile.
  - Progesterone level is high during the post ovulatory phase of menstrual cycle.
- Spot the odd one out from the following structures with reference to the male reproductive system.
 

|                            |                |
|----------------------------|----------------|
| (a) <i>Rete testis</i>     | (b) Epididymis |
| (c) <i>Vasa efferentia</i> | (d) Isthmus    |

4. Seminal plasma, the fluid part of semen, is contributed by
- Seminal vesicle
  - Prostate
  - Urethra
  - Bulbourethral gland
- (a) i and ii (b) i, ii and iv  
(c) ii, iii and iv (d) i and iv
5. Spermiation is the process of the release of sperms from
- (a) Seminiferous tubules (b) Vas deferens  
(c) Epididymis (d) Prostate gland
6. Mature Graafian follicle is generally present in the ovary of a healthy human female around
- (a) 5 to 8 days of menstrual cycle  
(b) 11 to 17 days of menstrual cycle  
(c) 18 to 23 days of menstrual cycle  
(d) 24 to 28 days of menstrual cycle
7. Acrosomal reaction of the sperm occurs due to
- (a) Its contact with zona pellucida of the ova.  
(b) Reactions within the uterine environment of the female.  
(c) Reactions within the epididymal environment of the male.  
(d) Androgens produced in the uterus.
8. Which one of the following is not a male accessory gland?
- (a) Seminal vesicle (b) Ampulla  
(c) Prostate (d) Bulbourethral gland
9. The immature male germ cell undergoes division to produce sperms by the process of spermatogenesis. Choose the correct option from below with reference to the above statement.
- (a) Spermatogonia have 46 chromosomes and always undergo meiotic cell division.  
(b) Primary spermatocytes divide by mitotic cell division.  
(c) Secondary spermatocytes have 23 chromosomes and undergo second meiotic division.  
(d) Spermatozoa are transformed into spermatids.
10. Match between the following representing parts of the sperm and their functions and choose the correct option.
- | <b>Column A</b> | <b>Column B</b>      |
|-----------------|----------------------|
| A. Head         | i. Enzymes           |
| B. Middle piece | ii. Sperm motility   |
| C. Acrosome     | iii. Energy          |
| D. Tail         | iv. Genetic material |
- (a) A-ii, B-iv, C-i, D-iii (b) A-iv, B-iii, C-i, D-ii  
(c) A-iv, B-i, C-ii, D-iii (d) A-ii, B-i, C-iii, D-iv
11. Which among the following has 23 chromosomes?
- (a) Spermatogonia (b) Zygote  
(c) Secondary oocyte (d) Oogonia



81. (c) 82. (b) 83. (b) 84. (c) 85. (d) 86. (b) 87. (b) 88. (c) 89. (b) 90. (a)  
91. (b) 92. (c) 93. (b) 94. (b) 95. (c) 96. (b) 97. (c) 98. (c) 99. (c) 100. (b)  
101. (d) 102. (a) 103. (b) 104. (c) 105. (d) 106. (c) 107. (d) 108. (a) 109. (a) 110. (a)  
111. (a) 112. (b) 113. (c) 114. (b) 115. (b) 116. (c) 117. (d) 118. (b) 119. (d) 120. (b)  
121. (c) 122. (b) 123. (b) 124. (c) 125. (b) 126. (c) 127. (c) 128. (c) 129. (d) 130. (a)  
131. (b) 132. (b) 133. (b) 134. (d) 135. (c) 136. (b) 137. (a) 138. (a) 139. (b) 140. (b)  
141. (b) 142. (a) 143. (c) 144. (c) 145. (c) 146. (b) 147. (b) 148. (b) 149. (a) 150. (b)  
151. (a) 152. (b) 153. (b) 154. (c) 155. (b) 156. (c) 157. (b) 158. (b) 159. (b) 160. (c)  
161. (b) 162. (b) 163. (b) 164. (b) 165. (a) 166. (d) 167. (b) 168. (c) 169. (d) 170. (b)  
171. (b) 172. (b) 173. (b) 174. (c) 175. (d) 176. (b) 177. (b) 178. (b) 179. (d) 180. (c)  
181. (c) 182. (b) 183. (d) 184. (d) 185. (d) 186. (c) 187. (a) 188. (a) 189. (d) 190. (c)  
191. (c) 192. (a) 193. (d) 194. (c) 195. (d) 196. (d) 197. (a) 198. (c) 199. (a) 200. (b)  
201. (c) 202. (b) 203. (b) 204. (b) 205. (c) 206. (a) 207. (c) 208. (a) 209. (c) 210. (c)  
211. (d) 212. (d) 213. (c) 214. (a) 215. (d) 216. (c) 217. (b) 218. (d) 219. (b) 220. (c)  
221. (c) 222. (c) 223. (d) 224. (c) 225. (a) 226. (b) 227. (d) 228. (b) 229. (d) 230. (c)  
231. (c) 232. (d) 233. (c)

*Assertion and Reason Questions*

234. (a) 235. (d) 236. (d) 237. (d) 238. (b) 239. (b) 240. (a) 241. (a) 242. (c) 243. (b)  
244. (b) 245. (a) 246. (a) 247. (b) 248. (a) 249. (a) 250. (a) 251. (a) 252. (a) 253. (a)  
254. (a)

*Previous Year Questions*

1. (b) 2. (a) 3. (d) 4. (a) 5. (c) 6. (b) 7. (b) 8. (b) 9. (b) 10. (b)  
11. (a) 12. (b) 13. (a) 14. (d) 15. (a) 16. (a) 17. (b) 18. (b) 19. (d) 20. (a)  
21. (d) 22. (d) 23. (a) 24. (d) 25. (a) 26. (b) 27. (c) 28. (a) 29. (c) 30. (c)  
31. (a) 32. (d) 33. (a) 34. (c) 35. (a) 36. (b) 37. (c) 38. (d) 39. (a) 40. (a)

*NCERT Exemplar Questions*

1. (c) 2. (d) 3. (d) 4. (b) 5. (a) 6. (b) 7. (a) 8. (b) 9. (c) 10. (b)  
11. (c) 12. (b) 13. (d) 14. (b) 15. (c) 16. (a) 17. (a) 18. (a)

*This page is intentionally left blank.*

## CHAPTER

# 4

# Reproductive Health

### PRACTICE QUESTIONS

#### Problems and Strategies

1. What is the full form of WHO?  
(a) Ware House Organization (b) War and Health Organization  
(c) World Health Office (d) World Health Organization
2. What are the various aspects of reproduction covered by WHO?  
(a) Physical, Emotional, Behavioural  
(b) Physical, Emotional, Behavioural, Social  
(c) Physical, Emotional, Gestational, Social  
(d) Physical, Emotional, Social
3. Which was the first country in the world to initiate a nationwide programme for reproductive health?  
(a) China (b) USA (c) India (d) Russia
4. The figure indicates which contraceptive device?



- (a) Condom for female (b) Condom for male  
(c) Diaphragm (d) Cervical cap
5. The programme of 'Family Planning' was initiated in the year \_\_\_\_\_.  
(a) 1950 (b) 1947 (c) 1949 (d) 1951
6. The reproductive program RCH stands for  
(a) Reproductive and Community Health Care  
(b) Restorative and Communal Health Care  
(c) Reproductive and Child Health Care  
(d) Reproductive and Congenital Health Care
7. In context of reproductive health, STD stands for  
(a) Sexually Terminal Disease (b) Sexually Transmitted Disease  
(c) Sexually Transformed Disease (d) Sexually Transducted Disease
8. The fluid which envelops the developing foetus is called  
(a) Chorionic fluid (b) Placental fluid  
(c) Amniotic fluid (d) Uterine fluid



9. Statutory ban has been laid on \_\_\_\_\_ to check female foeticide.  
 (a) Choriocentesis (b) Amniocentesis  
 (c) Uterocentesis (d) Embryocentesis
10. The amniocentesis test is based on \_\_\_\_\_ to determine the sex of developing foetus.  
 (a) External genitalia (b) Secondary sexual characters  
 (c) Chromosomal pattern (d) Embryonic enzymes
11. CDRI, Lucknow developed which new female contraceptive?  
 (a) 'Sakhi' (b) 'Saheli' (c) 'Saloni' (d) 'Smiti'
12. CDRI stands for  
 (a) Contraceptive Drug Research Institute  
 (b) Central District Research Institute  
 (c) Central Drug Research Institute  
 (d) Central Dermatologic Research Institute
13. The world population was 2000 million in the year  
 (a) 1980 (b) 1970 (c) 1960 (d) 1990
14. Which IUD is shown in the given figure?



- (a) Lippes loop (b) Progestasert  
 (c) Copper T (d) Multiload-375
15. By the year 2000, the world population rocketed to  
 (a) 6 million (b) 6 billion  
 (c) 6 trillion (d) 600 million
16. MMR stands for  
 (a) Magnetic Maxima Resonance (b) Mortality Memorandum Rate  
 (c) Mortality Maternal Rate (d) Maternal Mortality Rate
17. IMR stands for  
 (a) Indigenous Mortality Rate (b) Infant Migratory Rate  
 (c) Infant Mortality Rate (d) Infant Mitigation Rate
18. According to the census report of 2001, the population growth rate was  
 (a) 1.5% (b) 1.7% (c) 1.6% (d) 2.1%
19. Smaller families can be encouraged by using various  
 (a) Educational methods (b) Contraceptive methods  
 (c) Abortive methods (d) Rhythm method

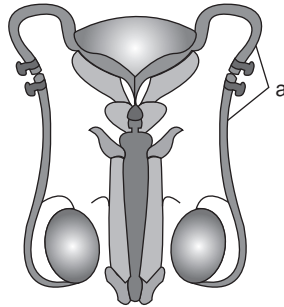
20. A wise way to encourage small families is by raising the marriageable age of female to \_\_\_\_\_ years and that of male to \_\_\_\_\_ years respectively.  
 (a) 16, 18 (b) 18, 20 (c) 18, 21 (d) 17, 22
21. Many couples in the urban working areas have adopted the \_\_\_\_\_ norm.  
 (a) Two child (b) One child  
 (c) No child (d) Three child
22. Identify the characteristic which an ideal contraceptive should not have.  
 (a) Use friendly (b) Easily available  
 (c) Non reversible (d) Least side effect
23. A natural method of contraception, periodic abstinence is  
 (a) Abstaining from coitus from day 1 to 5 of the menstrual cycle.  
 (b) Abstaining from coitus from day 17 to 22 of the menstrual cycle.  
 (c) Abstaining from coitus from day 10 to 17 of the menstrual cycle.  
 (d) Abstaining from coitus from day 5 to 10 of the menstrual cycle.
24. Coitus interrupts/withdrawal method concerns with  
 (a) Withdrawal of penis from vagina before ejaculation  
 (b) Withdrawal of penis from vagina after ejaculation  
 (c) Prevention of coitus  
 (d) Alternate prevention of coitus
25. After parturition, which natural contraception way can be utilized?  
 (a) Lactational menorrhoea (b) Lactational amenorrhoea  
 (c) Lactational deficiency (d) Lactational prevention
26. The figure indicates which contraceptive device?



- (a) Condom for female (b) Condom for male  
 (c) Diaphragm (d) Cervical cap
27. In lactational amenorrhoea, which event does not occur in menstrual cycle?  
 (a) Menstrual flow (b) Ovulation  
 (c) Follicular phase (d) Luteal phase
28. Lactational amenorrhoea is effective only up to a maximum of \_\_\_\_\_ months.  
 (a) Two (b) Four  
 (c) Six (d) Eight

29. In the \_\_\_\_\_ method of contraception ovum and sperms are prevented from physically meeting by the use of a membranous sheath.
- (a) Barrier (b) Sterilization  
(c) Natural (d) Pills
30. \_\_\_\_\_ is a popular brand of condom for males.
- (a) 'Nishodh' (b) 'Nirodh'  
(c) 'Nidosh' (d) 'Nirdosh'
31. Which of the following is not applicable to females for contraception?
- (a) Diaphragms (b) Vasectomy  
(c) Condoms (d) Cervical caps
32. Multiload 375 is a
- (a) Disease resistant crop (b) New viral vector  
(c) Intrauterine Device (d) Biological warfare device
33. IUD stands for
- (a) Intra Ureter Device (b) Intrinsic Uterine Device  
(c) Intrauterine Device (d) Intra Urinogenital Device
34. Lippes loop is a
- (a) Structure associated with nephron  
(b) Structure associated with male reproductive system  
(c) Structure associated with ligamentous tissue  
(d) A non-medicated IUD
35. Which of the following is a copper releasing IUD?
- (a) CUT (b) Multiload 375  
(c) Cu 7 (d) All of these
36. Progestasert is a
- (a) Oral contraceptive (b) Natural contraceptive  
(c) Hormonal IUD (d) Implant contraceptive
37. LNG-20 is a
- (a) Fuel (b) Modified crop  
(c) Hormonal IUD (d) Cu releasing IUD
38. Which of the following is a most widely used contraceptive in India?
- (a) IUD (b) Pills  
(c) Barrier method (d) Natural method
39. The pills used by females to prevent conception contain
- (a) Only oestrogen (b) Only progestogen  
(c) Combination of oestrogen progestogen (d) Both (b) and (c)
40. The 'Pills' have to be taken for contraception continuously for a period \_\_\_\_\_ days.
- (a) 22 (b) 21 (c) 24 (d) 25
41. Oral pills work by
- (a) Inhibiting ovulation (b) Inhibiting implantation  
(c) Altering the quality of mucus (d) All of these

Figure given for questions 42 – 43.



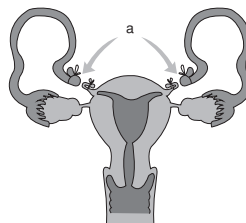
42. Which portion of male reproductive system has been cut and ligated in figure?
  - (a) Vasa efferentia
  - (b) Urethra
  - (c) Vas deferens
  - (d) Rete testis
43. The surgical procedure indicated in the figure is
  - (a) Tubectomy
  - (b) Hysterectomy
  - (c) Vasectomy
  - (d) Orchiectomy
44. ‘Saheli’, the new oral contraceptive for females, contains a \_\_\_\_\_ preparation.
  - (a) Steroidal
  - (b) Peptide
  - (c) Non steroidal
  - (d) Inorganic
45. ‘Saheli’ is a/an \_\_\_\_\_ contraceptive pill.
  - (a) Emergency
  - (b) One week
  - (c) 72 hour
  - (d) One month
46. Apart from pills of progestogen alone or in combination with oestrogen, which other means can be used for contraception?
  - (a) Implants
  - (b) Injections
  - (c) Syrups
  - (d) Both (a) and (b)
47. Emergency contraceptive should be under which of the following conditions
  - (a) Casual unprotected intercourse
  - (b) In conjunction with pills
  - (c) Rape
  - (d) Both (a) and (c)
48. Emergency contraceptive should be used within \_\_\_\_\_ hours of unprotected intercourse.
  - (a) 48
  - (b) 72
  - (c) 36
  - (d) 86
49. To prevent further pregnancies, a surgical method called \_\_\_\_\_ is advised for male/female partner as a means of contraception.
  - (a) Radiation
  - (b) Sterilization
  - (c) Abortion
  - (d) Neutralization
50. Surgical method for terminal contraception work on which of the following grounds?
  - (a) Block gamete transport
  - (b) Block gamete generation
  - (c) Alter biochemical nature of gamete
  - (d) Destroys gamete permanently
51. Sterilization procedure in males is known as
  - (a) Tubectomy
  - (b) Vasectomy
  - (c) Testectomy
  - (d) Spermectomy

52. Sterilization procedure in females is known as  
 (a) Vasectomy (b) Tubectomy  
 (c) Hysterectomy (d) Ovary
53. In vasectomy, a small portion of which duct is removed and tied up?  
 (a) Testis (b) Epididymis  
 (c) Vas deferens (d) Vasa efferentia
54. In tubectomy, which part of reproductive system is removed and/or tied up?  
 (a) Cervix (b) Oviduct (c) Uterus (d) Ovary
55. Which of the following is/are the ill-effect/effects of using contraceptives?  
 (a) Abdominal pain (b) Breast cancer  
 (c) Irregular menstrual bleeding (d) All of these
56. Intentional or voluntary termination of pregnancy before full term is called \_\_\_\_\_.  
 (a) Medical transformation of pregnancy (b) Median terminal pregnancy  
 (c) Medical Termination of Pregnancy (d) None of these
57. Nearly \_\_\_\_\_ MTPs are performed in a year all over the world.  
 (a) 45 to 50 billion (b) 45 to 50 million  
 (c) 45 to 50 thousands (d) 45 to 50 lacs
58. Government of India legalized MTP in the year \_\_\_\_\_.  
 (a) 1970 (b) 1971 (c) 1972 (d) 1973
59. MTPs are considered relatively safe during \_\_\_\_\_ trimester of pregnancy.  
 (a) 1st (b) 2nd (c) 3rd (d) None of these
60. MTPs are harmful to mother and foetus during \_\_\_\_\_ trimester of pregnancy.  
 (a) 1st (b) 2nd (c) 3rd (d) None of these
61. Misuse of amniocentesis has led to the misuse of \_\_\_\_\_.  
 (a) MTP (b) STD (c) RTI (d) HIV

### Sexually Transmitted Diseases

62. Sexually transmitted diseases are also known as  
 (a) Venereal disease (b) Vulnerable diseases  
 (c) Reproductive tract infections (d) Both (a) and (c)

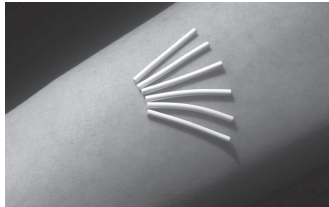
**Figure given for questions 63 – 64.**



63. Which portion of the female reproductive system is cut and ligated as in the figure?  
 (a) Uterus (b) Fallopian tubes  
 (c) Ovary (d) Cervix

64. The surgical procedure indicated in the figure is  
(a) Tubectomy (b) Hysterectomy  
(c) Vasectomy (d) Orchidectomy
65. Which infections can be transmitted by sharing of injection needles, surgical instruments, etc., with infected persons; through transfusion of blood, or from an infected mother to the foetus?  
(a) AIDS (b) Hepatitis B  
(c) Genital herpes (d) Both (a) and (b)
66. Which of the following STD is not completely curable?  
(a) Gonorrhoea (b) Genital warts  
(c) Genital herpes (d) Chlamydia
67. Which of these options is correct with regards to statements X and Y?  
**Statement X:** Some STDs do not show symptoms in females.  
**Statement Y:** Some STDs in females may remain undetected for long time.  
(a) Statement 'X' and 'Y' are correct and 'X' is the correct explanation for 'Y'.  
(b) Only statement 'X' is correct.  
(c) Only statement 'Y' is correct.  
(d) Statement 'X' and 'Y' are correct.
68. Severe complications of STDs lead to further complications like  
(a) Abortion (b) Still birth  
(c) Ectopic pregnancy (d) All of these
69. The age group of \_\_\_\_\_ years is quite vulnerable to STDs.  
(a) 10 to 19 (b) 15 to 22 (c) 17 to 27 (d) 15 to 24
70. In order to prevent STDs, one of the following is not correct?  
(a) Avoid sex with unknown partners/multiple partners.  
(b) Go to an unqualified doctor at earliest instance of STD.  
(c) Always use condoms during coitus.  
(d) Participate in sex education sessions.
71. The reasons for infertility can be  
(a) Physical (b) Diseases  
(c) Psychological (d) All of these
72. In India, which gender is generally wrongly blamed for being infertile?  
(a) Woman (b) Man  
(c) Either man or woman (d) Genetic factors
73. In India, most of the infertility cases are because of the  
(a) Male (b) Female  
(c) Either (a) and (b) (d) Hereditary disorders
74. In order to combat infertility, special techniques are used like \_\_\_\_\_.  
(a) Stimulated reproductive technologies (b) Assisted reproductive technologies  
(c) Fertile reproductive technologies (d) In vitro fertilization
75. Fertilization outside the body in almost similar conditions as that in the body is termed as  
(a) In vitro fertilization (b) Ex vivo fertilization  
(c) In vivo fertilization (d) Ex vitro fertilization

76. Which of the following defines 'Test Tube Baby' correctly?  
 (a) Ova and sperms are collected and mixed in test tube to form zygote.  
 (b) Ova and sperms are centrifuged in test tube to form zygote.  
 (c) Ova and sperms are induced to form zygote under controlled condition.  
 (d) Embryogenesis is allowed to continue in test tube under controlled conditions.
77. Under ZIFT procedure, zygote or embryos, with up to 8 blastomeres can be transferred into the  
 (a) Uterus (b) Placenta  
 (c) Fallopian tube (d) Cervix
78. WHO refers reproductive health as  
 (a) Physically healthy reproductive organ  
 (b) Functionally healthy reproductive organ  
 (c) Normal emotional and behavioural interaction among people in all sex related aspects.  
 (d) All the above
79. Programme called family planning was initiated in \_\_\_\_\_.  
 (a) 1941 (b) 1951 (c) 1961 (d) 1971
80. What is shown in the figure?



- (a) Copper T (b) Implants (c) Stents (d) Vault
81. Full form of RCH is  
 (a) Reproduction and Contraception Hazard (b) Reproductive and Child Health Care  
 (c) Research and Care Development (d) Reproductive Community Health Centre
82. 'Saheli', oral contraceptive for the females was developed by which institute?  
 (a) CDRI, Lucknow (b) NBG, Lucknow  
 (c) Kazari, Jodhpur (d) NIV, Pune
83. The following are indicative signs which indicate improved reproductive health of society. Choose the correct combination.  
 (i) Better awareness about sex related problem  
 (ii) Better detection and cure of STDs  
 (iii) Better Postnatal care  
 (iv) Increased number of couples with large families  
 (a) i and iv only (b) ii, iii and iv only  
 (c) i and ii only (d) i, ii and iii only
84. Every \_\_\_\_\_ person in the world is an Indian.  
 (a) 4th (b) 6th (c) 8th (d) 10th

85. India's population grew from 350 million to a billion in 2000 mainly due to
- (i) Rapid decline in death rate (MMR and IMR).
  - (ii) Increase in number of people in reproducecible age group.
  - (iii) Increase in number of people in post-reproductive age group.
- (a) (iii) only (b) (i) and (iii) only  
(c) (i) and (ii) only (d) (i) only
86. Motivation for smaller families in India can be provided by
- (a) Slogans like 'Hum Do Hamare Do'.
  - (b) Raising marriageable age (female–18 years and male–21 years).
  - (c) Giving incentive to couples with small families.
  - (d) All the above
87. An ideal contraceptive should be
- (A) User-friendly
  - (B) Easily available
  - (C) Effective and reversible
  - (D) With nor or least side-effects
- (a) A, B and C only (b) A and D only  
(c) B and C only (d) All

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
  - (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
  - (c) If the assertion is true but the reason is false.
  - (d) If both the assertion and reason are false.
88. **Assertion:** Statutory ban on amniocentesis for sex determination is done.  
**Reason:** There is increase in female foeticides.
89. **Assertion:** There is decrease in maternal and infant mortality rates nowadays.  
**Reason:** Better awareness about sex related matter, increased number of medical assisted deliveries and better post-natal care leading to it.
90. **Assertion:** Couple avoid coitus from day 10 to 17 of the menstrual cycle and it is one of the easy method of contraceptions.  
**Reason:** Ovulation occurs during these days (fertile period) so there is no chance of conception by abstaining from coitus during this period
91. **Assertion:** Barrier method is one of the contraceptive methods.  
**Reason:** Barrier method prevents physical meeting of ovum and sperm.
92. **Assertion:** Spermicidal creams, jellies and foams are usually used along with nutrients.  
**Reason:** All of the above products increases their contraceptive efficiency.



93. **Assertion:** Copper releasing IUDs are used as contraceptives.  
**Reason:** Cu ions released from IUDs suppresses the sperm motility and the fertilizing capacity of sperms.
94. **Assertion:** Intentional or voluntary termination of pregnancy before full term is called MTP.  
**Reason:** MTP has a insignificant role in decreasing the population.
95. **Assertion:** GIFT is gamete intra fallopian transfer.  
**Reason:** ZIFT is zygote intra fallopian transfer.
96. **Assertion:** IUT is ART.  
**Reason:** IVF embryo is transferred to uterus to complete (more than 8 blastomere) its further development .
97. **Assertion:** Inability to conceive or produce children even after years of unprotected sexual cohabitation is called infertility.  
**Reason:** ART is commonly used for such couples.
98. **Assertion:** Saheli is the oral contraceptive.  
**Reason:** They are non steroidal oral preparation inhibits implantation of fertilized ovum.
99. **Assertion:** As long as mother breast feeds the child fully, chances of conception are almost nil.  
**Reason:** Menstrual cycle and ovulation do not occur during the period of intense lactation.
100. **Assertion:** Coitus interruptus is method of contraception. .  
**Reason:** It prevents insemination.
101. **Assertion:** STDs are a major threat to a healthy society.  
**Reason:** Complication of STDs are PID, abortions, still births, infertility, ectopic pregnancies and even cancer of the reproductive tract.

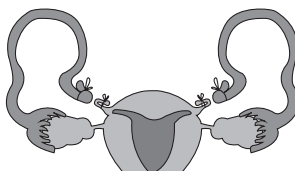
---

### PREVIOUS YEAR QUESTIONS

---

1. In vitro fertilization is a technique that involves transfer of which one of the following into the fallopian tube? [AIPMT PRE 2010]
- (a) Embryo only, upto 8 cell stage
  - (b) Either zygote or early embryo upto 8 cell stage
  - (c) Embryo of 32 cell stage
  - (d) Zygote only
2. The permissible use of the technique amniocentesis is for [AIPMT PRE 2010]
- (a) Detecting sex of the unborn foetus
  - (b) Artificial insemination
  - (c) Transfer of embryo into the uterus of a surrogate mother
  - (d) Detecting any genetic abnormality

3. Cu ions released from copper-releasing Intrauterine Devices (IUDs): [AIPMT PRE 2010]
- (a) Makes uterus unsuitable for implantation (b) Increases phagocytosis of sperms  
(c) Suppress sperm motility (d) Prevent ovulation
4. Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks pregnancy? [AIPMT PRE 2011]
- (a) 12 weeks (b) 18 weeks (c) 6 weeks (d) 8 weeks
5. If for some reason, the vasa efferentia in the human reproductive system get blocked, the gametes will not be transported from [AIPMT PRE 2011]
- (a) Epididymis to vas deferens (b) Ovary to uterus  
(c) Vagina to uterus (d) Testes to epididymis
6. Which one of the following is the most widely accepted method of contraception in India at present? [AIPMT PRE 2011]
- (a) Tubectomy (b) Diaphragms  
(c) IUDs (Intrauterine Devices) (d) Cervical caps
7. The technique called Gamete Intra Fallopian Transfer (GIFT) is recommended for those females [AIPMT MAINS 2011]
- (a) Who cannot produce an ovum.  
(b) Who cannot retain the foetus inside uterus.  
(c) Whose cervical canal is too narrow to allow the passage for the sperms.  
(d) Who cannot provide suitable environment for fertilization.
8. What does the given below figure depicts in particular?



- [AIPMT PRE 2012]
- (a) Ovarian cancer (b) Uterine cancer  
(c) Tubectomy (d) Vasectomy
9. One of the legal methods of birth control is [AIPMT 2013]
- (a) Abortion by taking an appropriate medicine.  
(b) By abstaining from coitus from day 10 to 17 of the menstrual cycle.  
(c) By having coitus at the time of day break.  
(d) By a premature ejaculation during coitus.
10. Which of the following cannot be detected in a developing foetus by amniocentesis? [AIPMT 2013]
- (a) Klinefelter syndrome (b) Sex of the foetus  
(c) Down syndrome (d) Jaundice

11. Artificial insemination means [AIPMT 2013]
- (a) Transfer of sperms of a healthy donor to a test tube containing ova.
  - (b) Transfer of sperms of husband to a test tube containing ova.
  - (c) Artificial introduction of sperms of a healthy donor into the vagina.
  - (d) Introduction of sperms of a healthy donor directly into the ovary.
12. Tubectomy is a method of sterilization in which [AIPMT 2014]
- (a) Small part of the fallopian tube is removed or tied up.
  - (b) Ovaries are removed surgically.
  - (c) Small part of vas deferens is removed or tied up.
  - (d) Uterus is removed surgically.
13. Which of the following is a hormone releasing Intrauterine Device (IUD)? [AIPMT 2014]
- (a) Multiload 375
  - (b) LNG-20
  - (c) Cervical cap
  - (d) Vault
14. Assisted reproductive technology, IVF involves the transfer of [AIPMT 2014]
- (a) Ovum into the fallopian tube
  - (b) Zygote into the fallopian tube
  - (c) Zygote into the uterus
  - (d) Embryo with 16 blastomeres into the fallopian tube
15. Which of the following viruses is not transferred through semen of an infected male? [AIPMT 2015]
- (a) Hepatitis B virus
  - (b) Human immunodeficiency virus
  - (c) Chikungunya virus
  - (d) Ebola virus
16. Which of the following is not a sexually transmitted disease? [AIPMT 2015]
- (a) Syphilis
  - (b) Acquired Immuno Deficiency Syndrome (AIDS)
  - (c) Trichomoniasis
  - (d) Encephalitis
17. A childless couple can be assisted to have a child through a technique called GIFT. The full form of this technique is [RE-AIPMT 2015]
- (a) Gamete intra fallopian transfer
  - (b) Gamete internal fertilization and transfer
  - (c) Germ cell internal fallopian transfer
  - (d) Gamete inseminated fallopian transfer
18. In context of Amniocentesis, which of the following statements is incorrect? [NEET - I, 2016]
- (a) It is usually done when a woman is between 14–16 weeks pregnant
  - (b) It is used for prenatal sex determination
  - (c) It can be used for detection of Down syndrome
  - (d) It can be used for detection of Cleft palate

19. Which of the following approaches does not give the defined action of contraceptive?

[NEET - I, 2016]

|                             |   |
|-----------------------------|---|
| (a) Barrier methods         | Prevent fertilization   |
| (b) Intra uterine devices   | Increases phagocytosis of sperms suppress sperm motility and fertilizing capacity of sperms |
| (c) Hormonal contraceptives | Prevent retard entry of sperms, prevent ovulation and fertilization                         |
| (d) Vasectomy               | Prevents spermatogenesis  |

20. Which of the following is hormone releasing IVD?

[NEET - II, 2016]

- (a) Multiload 375 (b) Lippes loop  
(c) Cu7 (d) LNG-20

21. Which of the following is incorrect regarding vasectomy?

[NEET - II, 2016]

- (a) No sperm occurs in epididymis (b) Vasa deferentia is cut and tied  
(c) Irreversible sterility (d) No sperm occurs in seminal fluid

22. Embryo with more than 16 blastomeres formed due to in vitro fertilization is transferred into

[NEET - II, 2016]

- (a) Fallopian tube (b) Fimbriae  
(c) Cervix (d) Uterus

### NCERT EXEMPLAR QUESTIONS

- The method of directly injecting a sperm into ovum is assisted by a reproductive technology called  
(a) GIFT (b) ZIFT (c) ICSI (d) ET
- Increased IMR and decreased MMR in a population will  
(a) Cause rapid increase in growth rate  
(b) Result in the decline in growth rate  
(c) Not cause significant change in growth rate  
(d) Result in an explosive population/exp
- Intensely lactating mothers do not generally conceive due to the  
(a) Suppression of gonadotropins  
(b) Hypersecretion of gonadotropins  
(c) Suppression of gametic transport  
(d) suppression of fertilization
- Sterilization techniques are generally fool proof methods of contraception with minimum side effects. Yet, this is the last option for the couples because
  - It is almost irreversible
  - Of the misconception that it will reduce sexual urge/drive
  - It is a surgical procedure
  - Of lack of sufficient facilities in many parts of the country

Choose the correct option:

- (a) i and iii (b) ii and iii  
(c) ii and iv (d) i, ii, iii and iv
5. A national level approach to build up a reproductively healthy society was taken up in our country during  
(a) 1950s (b) 1960s (c) 1980s (d) 1990s
6. Emergency contraceptives are effective if used within  
(a) 72 hours of coitus (b) 72 hours of ovulation  
(c) 72 hours of menstruation (d) 72 hours of implantation
7. Choose the right one among the statements given below:  
(a) IUDs are generally inserted by the user herself.  
(b) IUDs increase phagocytosis reaction in the uterus.  
(c) IUDs suppress gametogenesis.  
(d) IUDs once inserted need not be replaced.
8. The following statements are given regarding MTP. Choose the correct options given below:  
i. MTPs are generally advised during the first trimester.  
ii. MTPs are used as a contraceptive method.  
iii. MTPs are always surgical.  
iv. MTPs require the assistance of qualified medical personnel.  
(a) i and iii (b) ii and iii  
(c) i and iv (d) i and ii
9. From the sexually transmitted diseases mentioned below, identify the one which does not specifically affect the sex organs.  
(a) Syphilis (b) AIDS  
(c) Gonorrhoea (d) Genital warts
10. Condoms are one of the most popular contraceptives because of the following reasons:  
(a) These are effective barriers for insemination  
(b) They do not interfere with coital act  
(c) These help in reducing the risk of STDs  
(d) All of the above
11. Choose the correct statement regarding the ZIFT procedure:  
(a) Ova collected from a female donor are transferred to the fallopian tube to facilitate zygote formation.  
(b) Zygote is collected from a female donor and transferred to the fallopian tube.  
(c) Zygote is collected from a female donor and transferred to the uterus.  
(d) Ova collected from a female donor and transferred to the uterus.
12. The correct surgical procedure as a contraceptive method is  
(a) Ovariectomy (b) Hysterectomy (c) Vasectomy (d) Castration
13. Diaphragms are contraceptive devices used by the females. Choose the correct option from the statements given below:  
i. They are introduced into the uterus.  
ii. They are placed to cover the cervical region.

iii. They act as physical barriers for sperm entry.

iv. They act as spermicidal agents.

(a) i and ii

(b) i and iii

(c) ii and iii

(d) iii and iv

### Answer Keys

#### *Practice Questions*

1. (d) 2. (b) 3. (c) 4. (b) 5. (d) 6. (c) 7. (b) 8. (c) 9. (b) 10. (c)  
 11. (b) 12. (c) 13. (d) 14. (c) 15. (b) 16. (d) 17. (c) 18. (b) 19. (b) 20. (c)  
 21. (b) 22. (c) 23. (c) 24. (a) 25. (b) 26. (a) 27. (b) 28. (c) 29. (c) 30. (b)  
 31. (b) 32. (c) 33. (c) 34. (d) 35. (d) 36. (c) 37. (c) 38. (a) 39. (d) 40. (b)  
 41. (d) 42. (c) 43. (c) 44. (c) 45. (b) 46. (d) 47. (d) 48. (b) 49. (b) 50. (a)  
 51. (b) 52. (b) 53. (c) 54. (b) 55. (d) 56. (c) 57. (b) 58. (b) 59. (a) 60. (b)  
 61. (a) 62. (d) 63. (b) 64. (a) 65. (d) 66. (c) 67. (a) 68. (d) 69. (d) 70. (b)  
 71. (d) 72. (a) 73. (a) 74. (b) 75. (a) 76. (c) 77. (c) 78. (d) 79. (b) 80. (b)  
 81. (b) 82. (a) 83. (d) 84. (b) 85. (c) 86. (d) 87. (d)

#### *Assertion and Reason Questions*

88. (a) 89. (a) 90. (a) 91. (a) 92. (a) 93. (a) 94. (c) 95. (b) 96. (a) 97. (b)  
 98. (a) 99. (a) 100. (a) 101. (a)

#### *Previous Year Questions*

1. (b) 2. (d) 3. (c) 4. (a) 5. (d) 6. (c) 7. (a) 8. (c) 9. (a) 10. (d)  
 11. (c) 12. (a) 13. (b) 14. (b) 15. (c) 16. (d) 17. (a) 18. (d) 19. (d) 20. (d)  
 21. (a) 22. (d)

#### *NCERT Exemplar Questions*

1. (c) 2. (b) 3. (a) 4. (d) 5. (a) 6. (a) 7. (b) 8. (c) 9. (b) 10. (d)  
 11. (b) 12. (c) 13. (c)

*This page is intentionally left blank.*

# Genetics and Evolution

**Chapter 5:** Principles of Inheritance and Variation

**Chapter 6:** Molecular Basis of Inheritance

**Chapter 7:** Evolution

## Students Note

This is the most important unit in this book and requires extra understanding from students. This unit is divided into three chapters—Principles of Inheritance and Variation, Molecular Basis of Inheritance and Evolution. Students are suggested to read ‘64’ codon tables carefully and learn the pneumonics form it. Diagrams related to evolution should be prioritized as these form an integral part in AIPMT.



*This page is intentionally left blank.*

# Principles of Inheritance and Variation

## PRACTICE QUESTIONS

### Inheritance

- Mendel was born in
  - 17th century
  - 18th century
  - 19th century
  - 8th century
- Mendel was the native of
  - France
  - Sweden
  - India
  - Austria
- Mendel proposed which of the following terms for hereditary units?
  - Factor (determiner)
  - Genome
  - Genetic particle
  - None of these
- In genetics, the use of chequer board was done by
  - Mendel
  - Correns
  - Punnet
  - Darwin
- In 1900 CE, three biologists independently discovered Mendel's principles. They are
  - De Vries, Correns and Tschermak
  - Sutton, Morgan and Bridges
  - Avery, MacLeod and McCarty
  - Bateson, Punnet and Bridges
- Which of the following has been used for genetic researches?
  - Pisum
  - Neurospora
  - E. coli
  - All of these
- Organism of pure line is that which produces individuals of
  - Dominant characters
  - Recessive characters
  - Its own characters
  - Intermediate type
- Mendel is famous for his work on
  - Pisum
  - Drosophila
  - Neurospora
  - Oenothera
- The main reason for the success of Mendel was
  - Study of all the characters at the same time
  - Study of one character at one time
  - Study of all the plants at the same time
  - Counting of plants







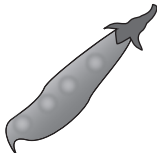

10. The alleles are
- A pair of genes governing a specific character such as tallness or dwarfness.
  - Multiple forms of genes.
  - Genes governing eye characters.
  - Genes present in allosomes.
11. An allele is said to be dominant if
- It is expressed only in heterozygous combination.
  - It is expressed only in homozygous combination.
  - It is expressed in both homozygous and heterozygous condition.
  - It is expressed only in second generation.
12. What is the correct sequence of the following events?
- Formation of the chromosome theory of heredity.
  - Experiments which proved that DNA is the hereditary material.
  - Mendel's laws of inheritance—discovery.
- (a) 1, 3 and 2                      (b) 1, 2 and 3                      (c) 3, 1 and 2                      (d) 2, 1 and 3
13. When a true breeding pea plant that has yellow seeds is pollinated by a plant that has green seeds, then all the  $F_1$  plants have yellow seeds. This means that the allele for yellow is
- Heterozygous
  - Dominant
  - Recessive
  - Lethal
14. An organism's genetic constitution is called its
- Genotype
  - Phenotype
  - Holotype
  - None of these
15. An organism with two identical alleles for a given trait is
- Homozygous
  - Segregating
  - Dominant
  - A hermaphrodite
16. What type of gametes will be formed by genotype  $RrYy$ ?
- $RY, Ry, rY, ry$
  - $RY, Ry, ry, ry$
  - $Ry, Ry, Yy, ry$
  - $Rr, RR, Yy, YY$
17. Which genotype characterizes an organism that is heterozygous for two genes?
- $RRYy$
  - $RrYY$
  - $RRYY$
  - $RrYy$
18. The dwarfness in plants of  $F_2$  generation is
- Recessive
  - Dominant
  - Both (a) and (b)
  - None of these
19. When heterozygous tall plants are self-pollinated, then tall and dwarf plants are obtained. This explains
- Law of purity of gamete
  - Segregation of law
  - Division in spores
  - Independent assortment
20. Mendel's principle of segregation was based on the separation of alleles in the garden pea during
- Pollination
  - Embryonic development
  - Seed formation
  - Gamete formation

21. Which of the following is the dominant character according to Mendel?  
(a) Dwarf plant and yellow fruit (b) Terminal fruit and wrinkled seed  
(c) White testa and yellow pericarp (d) Green coloured pod and rounded seed
22. In Mendelism, the linkage was not observed due to  
(a) Mutation (b) Independent assortment  
(c) Synapsis (d) Crossing over
23. Mendel's law of heredity can be explained with the help of  
(a) Mitosis (b) Meiosis  
(c) Both mitosis and meiosis (d) None of these
24. A cross between plants having RRYy and rryy composition will yield plants with  
(a) Round and yellow seeds (b) Round and green seeds  
(c) Wrinkled and yellow seeds (d) Wrinkled and green seeds
25. The genotype of an individual is Rr Bb. How many different types of gametes will it produce based on the law of independent assortment?  
(a) 16 (b) 9 (c) 8 (d) 4
26. Which of the following is heterozygous for two pairs of alleles?  
(a) TTRR (b) TrRR (c) ttrr (d) TrtR
27. In Mendel's experiment, nature of seed coat, flower colour, position of flower, pod colour, stem height, etc., are referred to as  
(a) Alleles (b) Genotypes  
(c) Phenotypes (d) All of these
28. A cross between a homozygous recessive and a heterozygous plant is called  
(a) Monohybrid cross (b) Dihybrid cross  
(c) Test cross (d) Back cross
29. Cross between  $F_1$  plant and recessive female plant is called  
(a) Back cross (b) Test cross (c) Out cross (d) Mutation
30. In  $F_2$  generation, a phenotypic ratio of 1 : 1 : 1 : 1 exhibits  
(a) Back cross (b) Monohybrid test cross  
(c) Lethality (d) Dihybrid test cross
31. Which of the following depicts the Mendel's dihybrid ratio?  
(a) 3 : 1 (b) 9 : 3 : 3 : 1 (c) 9 : 7 (d) 15 : 1
32. In dihybrid cross, out of 16 plants obtained, the number of genotypes will be  
(a) 4 (b) 9 (c) 16 (d) 12
33. Pure homozygous offsprings in a dihybrid cross in the  $F_2$  generation will be  
(a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$  (c)  $\frac{1}{8}$  (d)  $\frac{1}{16}$
34. In hybridization,  $Tt \times tt$  gives rise to the progeny of ratio  
(a) 1 : 1 (b) 1 : 2 (c) 2 : 1 (d) 1 : 2 : 1
35. Self-pollination between  $Tt$  and  $Tt$  plants results into the genotype ratio of  
(a) 3 : 1 (b) 1 : 2 : 1 (c) 1 : 3 (d) 4 : 0

36. Mendel crossed a pure white-flowered recessive pea plant with a dominant pure red-flowered plant. The first generation of hybrids from the cross should show
- 50 per cent white-flowered and 50 per cent red-flowered plants
  - All red-flowered plants
  - 75 per cent red-flowered and 25 per cent white-flowered plants
  - All white-flowered plants
37. If in a dihybrid cross, Mendel had used two such characters which have linked, he would have faced difficulty in explaining the results on the basis of his
- Law of segregation
  - Law of multiple factor hypothesis
  - Law of independent assortment
  - Law of dominance
38. From a cross  $Aa BB \times aa BB$ , which of the following genotypic ratio will be obtained in  $F_1$  generation?
- 1  $Aa BB$  : 1  $aa BB$
  - 1  $Aa BB$  : 3  $aa BB$
  - 3  $Aa BB$  : 1  $aa BB$
  - All  $Aa BB$  : No  $aa BB$
39. A farmer crossed a walnut combed chicken with a single combed one and obtained all walnut combed chickens in  $F_1$ . The genotype of the parents was
- $Rr Pp \times rr pp$
  - $RR PP \times rr pp$
  - $RR pp \times rr pp$
  - $RR Pp \times rr pp$
40. In sweet peas, genes  $C$  and  $P$  are necessary for colour in flowers. The flowers are white in the absence of either or both the genes. What will be the percentage of coloured flowers in the offspring of the cross  $Cc pp \times cc Pp$ ?
- 100%
  - 75%
  - 25%
  - 50%
41. In a monohybrid cross, 120 plants are obtained. The ratio of homozygous and heterozygous will be
- 40 : 80
  - 60 : 60
  - 20 : 100
  - 10 : 110
42. If Mendel had studied the seven traits using a plant with 12 chromosomes instead of 14, in what way would his interpretation have been different?
- He could have mapped the chromosome.
  - He would have discovered blending or incomplete dominance.
  - He would not have discovered the law of independent assortment.
  - He would have discovered sex linkage.
43. How many different types of genetically different gametes will be produced by a heterozygous plant having the genotype  $AABbCc$ ?
- 2
  - 4
  - 6
  - 9
44. Mendel's law of independent assortment is applicable for
- All genes in all organisms
  - All genes of pea plant only
  - All linked genes only
  - All non-linked genes only
45. In a plant, red fruit ( $R$ ) is dominant over yellow fruit ( $r$ ) and tallness ( $T$ ) is dominant over shortness ( $t$ ). If a plant with  $RRTt$  genotype is crossed with a plant that is  $rrtt$ , then
- 75 per cent will be tall with red fruit
  - All the offspring will be tall with red fruit
  - 25 per cent will be tall with red fruit
  - 50 per cent will be tall with red fruit
46. When a tall plant with rounded seeds ( $TTRR$ ) is crossed with a dwarf plant with wrinkled seeds ( $ttrr$ ), then the generation consists of tall plants with rounded seeds. How many types of gametes a plant would produce?
- One
  - Three
  - Four
  - Eight

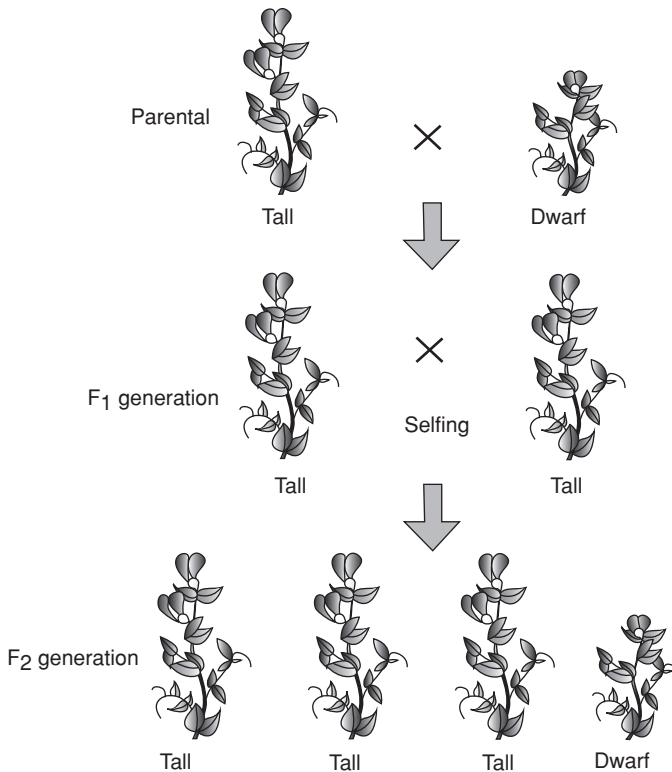
47. Mendel did his experiment on  
 (a) Garden pea (*Pisum sativum*) (b) Snapdragon  
 (c) *Drosophila* (d) *Lathyrus odoratus*
48. How many contrasting traits are chosen by Mendel?  
 (a) 7 (b) 14 (c) 21 (d) 4
49. Mendel conducted an experiment on garden pea for how many years?  
 (a) 7 (b) 10 (c) 4 (d) 15

50. Select the incorrect matching.

| Characters        | Dominant trait  | Recessive trait   |
|-------------------|---|---|
| (a) Seed shape    | <br>Round        | <br>Wrinkled |
| (b) Seed colour   | <br>Yellow       | <br>Green    |
| (c) Flower colour | <br>Violet       | <br>White    |
| (d) Pod shape     | <br>Constricted | <br>Full    |

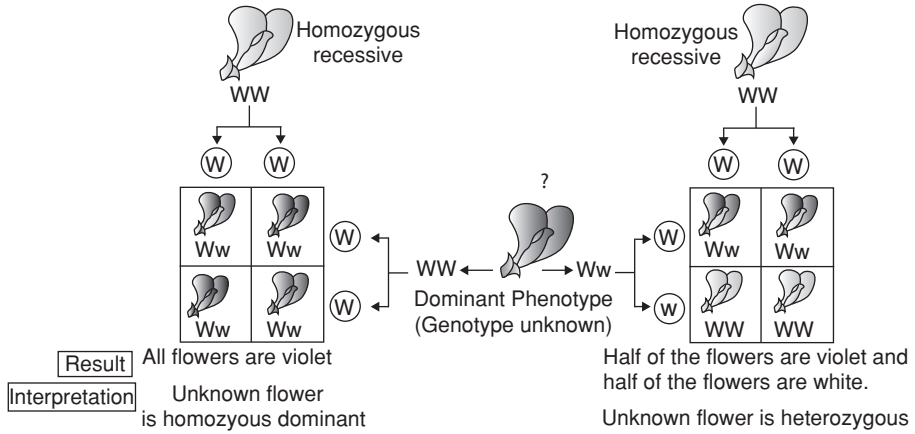
51. Number of character of garden pea flower chosen by Mendel?  
 (a) 1 (b) 2 (c) 3 (d) 4
52. Select the false statement from the following:  
 (a) Mendel for the first time applied statistical analysis and mathematical logics to problems in biology.  
 (b) Mendel's experiment had a large sampling size, which gave greater credibility to the data that he collected.  
 (c) Mendel conducted artificial cross-pollination experiment using true-breeding pea lines.  
 (d) Mendel selected 14 true-breeding pea plant varieties, as pairs which were similar except for two characters with contrasting traits.
53. In Mendelian dihybrid cross, how many individuals are homozygous dominant for both the genes in  $F_2$  generation?  
 (a)  $\frac{1}{16}$  (b)  $\frac{2}{16}$  (c)  $\frac{4}{16}$  (d)  $\frac{6}{16}$

54. In Mendelian dihybrid cross, how many individuals are homozygous recessive for one of the character only in  $F_2$  generation?
- (a)  $\frac{1}{16}$                       (b)  $\frac{2}{16}$                       (c)  $\frac{3}{16}$                       (d)  $\frac{6}{16}$
55. In Mendelian dihybrid cross, how many individuals are heterozygous of both the character in  $F_2$ -generation?
- (a)  $\frac{1}{16}$                       (b)  $\frac{2}{16}$                       (c)  $\frac{3}{16}$                       (d)  $\frac{4}{16}$
56. In Mendelian dihybrid cross, how many of progeny in  $F_2$  generation possess genotype rryy?
- (a)  $\frac{1}{16}$                       (b)  $\frac{2}{16}$                       (c)  $\frac{3}{16}$                       (d)  $\frac{4}{16}$
57. How many genotypes are formed in Mendelian dihybrid cross?
- (a) 4                      (b) 9                      (c) 6                      (d) 8
58. The below diagram shows:



- (a) Monohybrid cross                      (b) Dihybrid cross  
 (c) Trihybrid cross                      (d) All the above

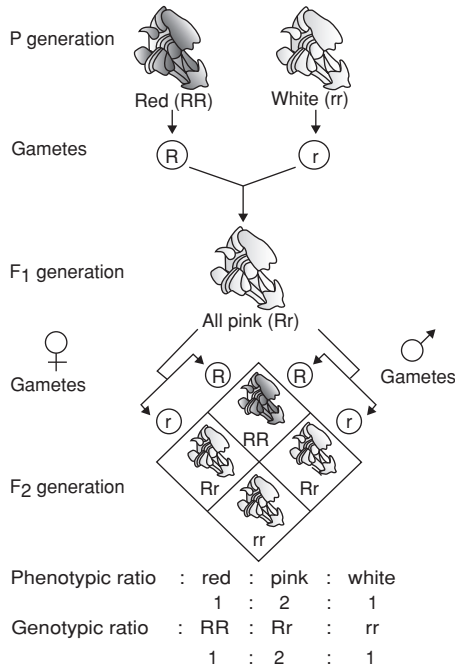
59. The below diagram represents



- (a) Back cross
- (c) Test cross

- (b) Out cross
- (d) Dihybrid cross

60. The below diagram represents

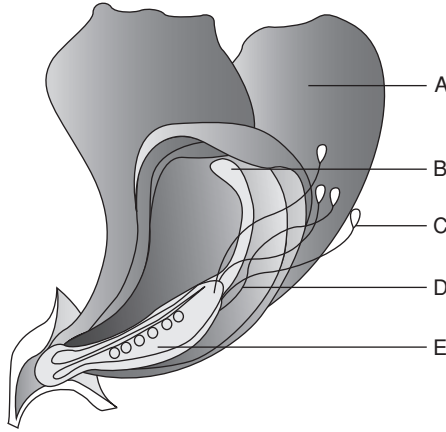


- (a) Dominant epistasis
- (c) Incomplete dominance

- (b) Recessive epistasis
- (d) Co-dominance

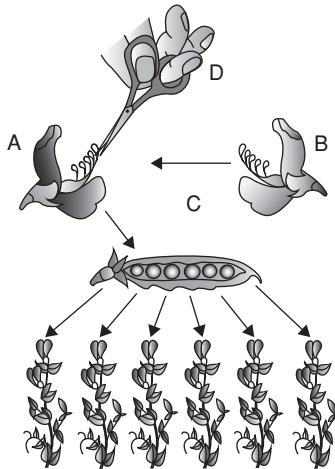


61. Identify A to E in this figure.



- (a) A: Petal; B: Stigma; C: Anther; D: Stamen; E: Carpel
- (b) A: Anther; B: Petal; C: Stigma; D: Carpel; E: Stamen
- (c) A: Carpel; B: Stamen; C: Anther; D: Stigma; E: Petal
- (d) A: Stigma; B: Petal; C: Stamen; D: Anther; E: Carpel

62. Identify A, B, C and D in this figure?



- (a) A: Female parent; B: Removal of anthers (Emasculation); C: Transfer of pollen (Pollination); D: Male parent
- (b) A: Male parent; B: Female parent; C: Removal of anthers (Emasculation); D: Transfer of pollen (Pollination)
- (c) A: Removal of anthers (Emasculation); B: Female parent; C: Transfer of pollen (Pollination); D: Male parent
- (d) A: Female parent; B: Male parent; C: Transfer of pollen (Pollination); D: Removal of anthers (Emasculation)

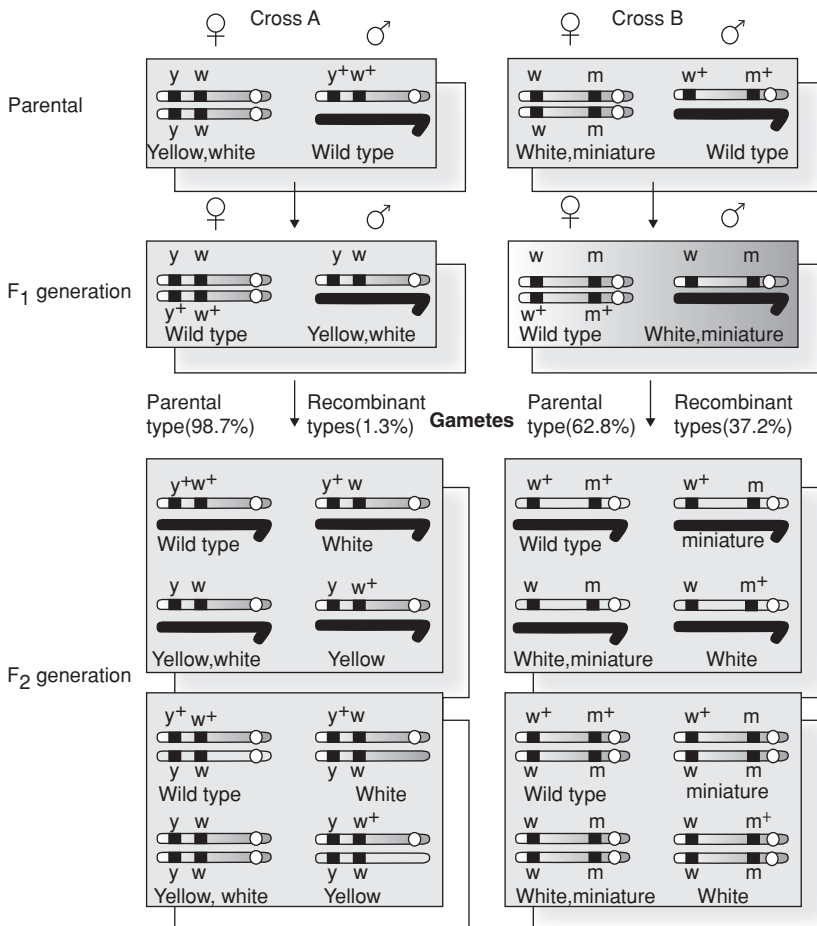
63. Inheritance of ABO blood group system is an example of  
(a) Multiple allelism (b) Partial dominance  
(c) Epistasis (d) Dominance
64. Genotype of blood group 'A' will be  
(a)  $I^A I^A$  (b)  $I^B I^B$   
(c)  $I^A I^A$  or  $I^A I^O$  (d)  $I^A I^O$
65. Blood group 'B' will have alleles  
(a) ii (b)  $I^A I^A$   
(c)  $I^B I^B$  (d)  $I^A I^B$
66. If one parent belongs to 'A' blood group and the other to 'O' blood group, their children possibly represent  
(a) A and B groups only (b) AB only  
(c) A and O groups only (d) All four groups
67. If a child has O type of blood group and the father has B type, then the genotype of the father will be  
(a)  $I^O I^O$  (b)  $I^A I^B$   
(c)  $I^O I^B$  (d)  $I^B I^B$
68. A person with antigens 'B' in RBC and antibodies 'A' in the plasma belongs to the blood group  
(a) A (b) B  
(c) AB (d) O
69. Rh factor may be responsible for  
(a) Turner's syndrome  
(b) AIDS  
(c) Sickle-cell anaemia  
(d) Erythroblastosis fetalis
70. A human female with blood group 'A' has  
(a) Antibody-anti-B in the red blood cells and antigen A in the serum  
(b) Antigen A in the red blood cells and antibody-anti-B in the serum  
(c) Antigen B in the red blood cells and antibody-anti-B in the serum  
(d) Antigen A in the red blood cells and antibody-anti-A in the serum
71. Rh factor is named after  
(a) Man (b) Rat  
(c) Monkey (d) Chimpanzee
72. If one parent has blood group A and the other parent has blood group B, the offspring have which blood group?  
(a) AB (b) O  
(c) BO (d) A, B, AB, O
73. Mendel did not recognize the linkage phenomenon in his experiments because  
(a) There were many chromosomes to handle.  
(b) Characters he studied were located on different chromosomes.  
(c) He did not have powerful microscope.  
(d) He studied only pure plants.

74. Exchange of genetic material between chromatids of homologous chromosomes during meiosis is called  
(a) Synapsis (b) Chiasmata  
(c) Transformation (d) Crossing over
75. In maize, the chromosome number is  $2n = 20$ . The number of linkage groups in it will be  
(a) 20 (b) 40  
(c) 10 (d) 5
76. The map distance between genes A and B is 3 units, between B and C is 10 units and between C and A is 7 units. The order of the genes in a linkage map constructed on the above data would perhaps be  
(a) A, B, C (b) A, C, B  
(c) B, C, A (d) B, A, C
77. Crossing over in diploid organism is responsible for  
(a) Dominance of genes (b) Linkage between genes  
(c) Segregation of alleles (d) Recombination of linked allele
78. The percentage of crossing over will be more if  
(a) Linked genes are located far apart from each other  
(b) Linked genes are located close to each other  
(c) Genes are not linked  
(d) Genes are located in a different cell
79. Linkage was first observed in  
(a) Field pea (b) Sweet pea  
(c) Pea (d) Grass pea
80. *Drosophila* has four pairs of chromosomes. How many linkage groups does it have?  
(a) Eight (b) Four  
(c) One less than the pairs of chromosomes (d) One more than the pairs of chromosomes
81. Linkage in *Drosophila* was first discovered by  
(a) Morgan (b) Bateson and Punnett  
(c) Sturtevant (d) Bridges
82. Number of linkage groups in *Pisum sativum* is  
(a) 2 (b) 5  
(c) 7 (d) 9
83. Who coined the term linkage?  
(a) Mendel (b) Tschermak  
(c) Sturtevant (d) T. H. Morgan
84. In humans, the chromosomal condition of male is  
(a)  $44 AA + XO$  (b)  $44 AA + XX$   
(c)  $44 AA + XY$  (d)  $44 AA + XXY$
85. Physical association of two genes is known as  
(a) Heterozygosis (b) Linkage  
(c) Recombination (d) Homozygosis

86. Find out the incorrect statement.

- (a) Morgan carried out several dihybrid crosses in drosophila to study the genes that were sex linked.
- (b) Sturtevant used the frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes and mapped their position on chromosome.
- (c) Henking gave the term X-body.
- (d) Boveri united the knowledge of chromosomal segregation with Mendelian principles and called it the chromosomal theory of inheritance.

87. Which cross shows very tight linkage?



- (a) Cross A
- (b) Cross B
- (c) Both (a) and (b)
- (d) None of these

88. Why *Drosophila melanogaster* is suitable for the study of genetical variation?
- Could be grown on simple synthetic medium in laboratory.
  - Complete life cycle is 2 weeks and single mating produces a large number of progeny flies.
  - Clear sexual dimorphism is present and many types of heredity variation can be seen with low power microscope.
  - All of these
89. Cytological observation made in a many number of \_\_\_\_\_ led to the development of the concept of genetic/chromosomal basis of sex determination
- Mammals
  - Birds
  - Humans
  - Insects
90. Who discovered X-body but could not explain its significance?
- Mendel
  - Morgan
  - Henking
  - De vries
91. X-body of Henking was
- Nucleus
  - Lipid
  - Chromosome
  - Ribosomes
92. X-chromosome is used in the determination of sex; therefore, it is known as
- Autosomes
  - Sex chromosomes
  - Microsomes
  - Oxysomes
93. Which type of sex-determination is found in grasshopper?
- XO type
  - XY type
  - ZW type
  - Any of these
94. In the number of insects and mammals the type of sex determination is
- XO type
  - XY type
  - ZW type
  - Any of these
95. Male is homogametic in
- Drosophila*
  - Human
  - Fowl
  - All of these
96. How many chromosomes are present in human male?
- 22 Pairs + XX
  - 22 Pairs + YY
  - 22 Pairs + XY
  - 21 Pairs + XY
97. The below figure possess which of the following sex chromosomes?



- XX
- XY
- ZZ
- ZW

98. The below diagram shows



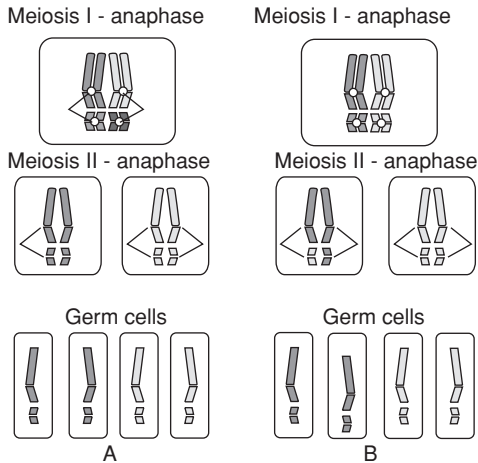
- (a) M and F drosophila, respectively  
(b) M and F housefly, respectively  
(c) F and M drosophila, respectively  
(d) F and M housefly, respectively
99. Which of the following is responsible for sex of the chicks?  
(a) Sperm  
(b) Egg  
(c) Both (a) and (b)  
(d) None of these
100. Find out the correct statement.  
(a) Genetic makeup of the egg determines the sex of the child in human.  
(b) Genetic makeup of the sperm determines the sex of the child in human.  
(c) XO and XY type of sex determination is an example of female heterogamety.  
(d) Henking (1891) could trace a specific nuclear structure all through oogenesis of few insects.
101. Female heterogamety is found in  
(a) Human  
(b) Drosophila  
(c) Chicks  
(d) All of these
102. Why Mendel's work was not recognized till 1900?  
(a) His work could not be widely published.  
(b) His concept of factor (stable and discrete units that control expression of trait) was not accepted by his contemporaries.  
(c) His approach of using mathematics to explain biological phenomenon was totally new and unacceptable by many of the biologists of his time.  
(d) All of these
103. How many scientists rediscovered mendelism in 1900 independently?  
(a) 1  
(b) 2  
(c) 3  
(d) 4
104. Mendelian rediscoverers are  
(a) De Vries, Holland  
(b) Correns, Germany  
(c) Von Tschermak, Austria  
(d) All of these
105. Who noted that the behaviour of chromosomes was parallel to the behaviour of genes and uses chromosome movement to explain Mendel's law?  
(a) T. H. Morgan  
(b) Hugo de Vries  
(c) Sutton and Boveri  
(d) Beadle and Tatum

106. Which of the below column A and B represents genes and chromosomes?

| A  | B  |
|--|--|
| 1. Occur in pairs.   | 2. Occur in pairs.   |
| 3. Segregate at the time of gamete formation such that only one of each pair is transmitted to a gamete. | 4. Segregate at the time of gamete formation and only one of each pair is transmitted to a gamete. |
| 5. Independent pairs segregate independently of each other.  | 6. One pair segregates independently of another pair.  |

- (a) A: Gene, B: Gene  
 (b) A: Chromosome, B: Chromosome  
 (c) A: Gene, B: Chromosome  
 (d) A: Chromosome, B: Gene

107. Which of the diagrams represents independent assortment?



- (a) A only  
 (b) B only  
 (c) Both (a) and (b)  
 (d) None of these

108. Identify A and B in this figure.




- (a) A: Male, B: Female  
 (b) A: Female, B: Male  
 (c) A: Male, B: Male  
 (d) A: Female, B: Female

**Genetic Disorder**




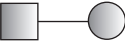
109. The method for analyzing inheritance pattern of traits in human being is

- (a) DNA finger printing
- (b) Control cross
- (c) Pedigree analysis
- (d) All of these

110. The standard symbol used for consanguineous mating in pedigree analysis is

- (a) 
- (b) 
- (c) 
- (d) 

111. Select the correct matching regarding standard symbol of pedigree analysis

| Column-I  | Column-II           |
|---|---------------------|
| (A)  | (1) Female          |
| (B)  | (2) Male            |
| (C)  | (3) Mating          |
| (D)  | (4) Sex unspecified |

- (a) A : 2, B : 1, C : 4, D : 2
- (b) A : 2, B : 1, C : 2, D : 4
- (c) A : 1, B : 2, C : 2, D : 4
- (d) A : 1, B : 2, C : 4, D : 2

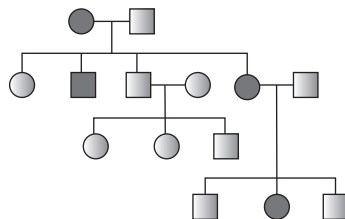
112. Which symbol represents parents with male child affected with diseases?

- (a) 
- (b) 
- (c) 
- (d) 

113. Which of the following symbol is not used in pedigree analysis?

- (a) 
- (b) 
- (c) 
- (d) 

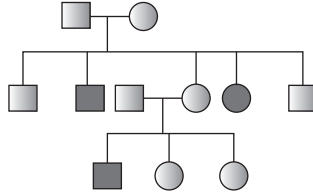
114. The following pedigree shows





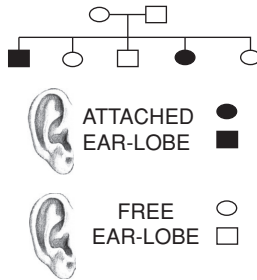
- (a) Autosomal dominant trait
- (b) Autosomal recessive trait
- (c) X-linked recessive trait
- (d) X-linked dominant trait

115. The following pedigree shows



- (a) Autosomal dominant trait
- (b) Autosomal recessive trait
- (c) X-linked recessive trait
- (d) X-linked dominant trait

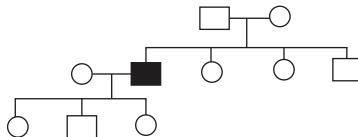
116. Given below is a pedigree chart of family with five children. It shows the inheritance of attached ear-lobes as opposed to the free ones. The squares represent the male individuals and circles the female individuals.



Which one of the following conclusions drawn is correct?

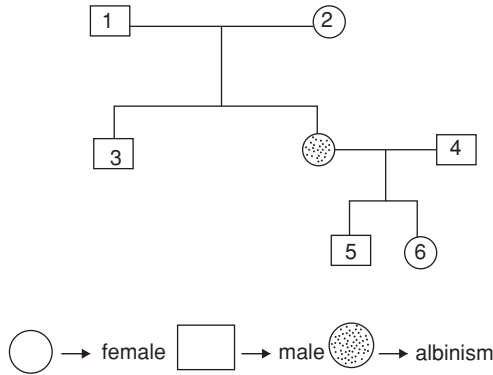
- (a) The parents are homozygous recessive.
- (b) The trait is Y-linked.
- (c) The parents are homozygous dominant.
- (d) The parents are heterozygous.

117. Predict from the following chart



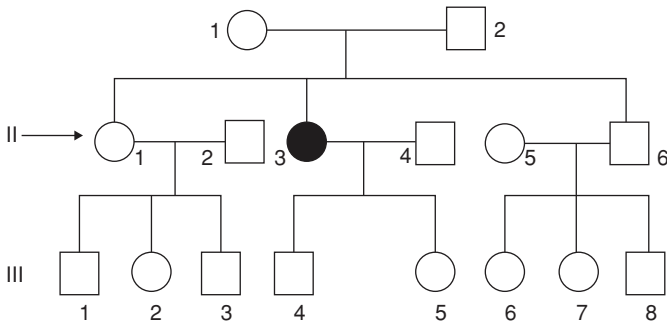
- (a) Character is dominant and carried by x chromosome.
- (b) Character is carried by y chromosome.
- (c) Character is sex-linked recessive.
- (d) Character is autosomal recessive.

118. The pedigree shows the occurrence of albinism which is a recessive trait. If person 4 is homozygous, the carrier for the trait is



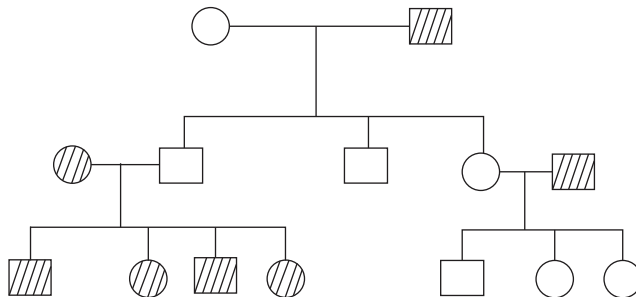
- (a) 1, 4, 5 and 6
- (b) 5 and 6
- (c) 1, 2 and 3
- (d) 1, 2, 5 and 6

119. This is the pedigree for autosomal recessive disease albinism (aa). What is the probability of II-1 homozygous normal?



- (a)  $\frac{1}{3}$
- (b)  $\frac{1}{2}$
- (c)  $\frac{2}{3}$
- (d)  $\frac{1}{4}$

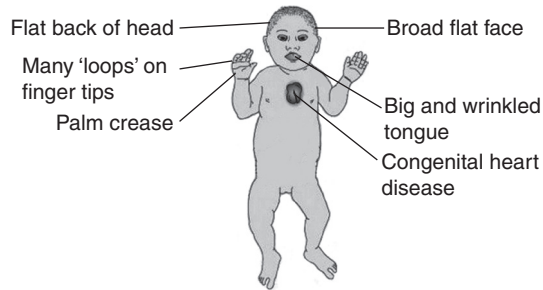
120. According to the given pedigree, the trait indicates





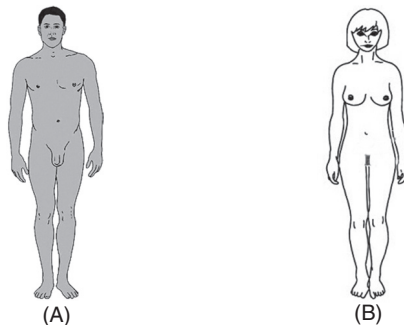


131. The below diagram shows which type of syndrome?



- (a) Down's syndrome  
(b) Cri-du chat syndrome  
(c) PKU  
(d) Turner's syndrome
132. Increase in a whole set of chromosome in an organism is known as  
(a) Polyploidy  
(b) Aneuploidy  
(c) Trisomy  
(d) Tetrasomy
133. Langdon down described Down's syndrome in which year  
(a) 1866  
(b) 1890  
(c) 1852  
(d) 1953
134. Two allelic genes are located on  
(a) The same chromosomes  
(b) Two homologous chromosomes  
(c) Two non-homologous chromosomes  
(d) Any two chromosomes
135. In human beings, the colour of skin is controlled by  
(a) Multiple alleles  
(b) Lethal genes  
(c) Polygenic effect  
(d) None of these
136. Which of the following is genetically dominant in man?  
(a) Colour blindness  
(b) Rh positive  
(c) Haemophilia  
(d) Albinism
137. If a certain patient with blood group B requires immediate blood transfusion, the following type can be given to him  
(a) O and B  
(b) O and AB  
(c) A and AB  
(d) B and AB
138. Karyotype of Klinefelter's syndrome is  
(a) 44 + XXY  
(b) 44 + XO  
(c) 44 + XYY  
(d) 44 + XXXY
139. Which is not a character of Klinefelter's syndrome?  
(a) Masculine development  
(b) Gynaecomastia  
(c) Fertile individual  
(d) Sterile individual
140. All are characters of Down's syndrome except  
(a) Congenital heart disease  
(b) Broad flat face  
(c) Small and wrinkled tongue  
(d) Many 'loops' on finger tips

141. Identify the syndrome of diagrams a and b, respectively.



- (a) A: Down's syndrome, B: Turner's syndrome  
 (b) A: Klinefelter's syndrome, B: Turner's syndrome  
 (c) A: Turner's syndrome, B: Klinefelter syndrome  
 (d) A: Turner's syndrome, B: Down's syndrome
142. Which karyotype present monosomy?  
 (a)  $2n + 1$  (b)  $2n - 2$   
 (c)  $2n - 1$  (d)  $2n + 2$
143. Which karyotype represents trisomy?  
 (a)  $2n + 1$  (b)  $2n - 2$   
 (c)  $2n - 1$  (d)  $2n + 2$
144. Find out the total number of Mendelian disorder from the following:  
*Cystic Fibrosis, Haemophilia, Sickle cell anaemia, Colour blindness, Thalessemia, Phenylketonuria*  
 (a) 4 (b) 5  
 (c) 6 (d) 3
145. Which of the following is sex-linked recessive disorder?  
 (a) Myotonic dystrophy (b) Sickle-cell anaemia  
 (c) Haemophilia (d) Phenylketonuria
146. Which of the following is an autosomal dominant trait?  
 (a) Phenylketonuria (b) Sickle-cell anaemia  
 (c) Haemophilia (d) Myotonic dystrophy
147. Queen Victoria was a carrier of which disease?  
 (a) Myotonic dystrophy (b) Sickle-cell anaemia  
 (c) Haemophilia (d) Phenylketonuria
148. Sickle cell anaemia is caused by the substitution of Glutamic acid (Glue) by \_\_\_\_\_ at the sixth position of the beta globin chain of the haemoglobin molecule.  
 (a) Asn (Asparagine) (b) Gly (Glycine)  
 (c) Arg (Arginine) (d) Val (Valine)

149. Which enzyme is defective in PKU?

(A) DOPA  $\xrightarrow{\text{Enzyme(1)}}$  Melanin

(B) Tyrosine  $\xrightarrow{\text{Enzyme(2)}}$  Thyroxin

(C) Phenylalanine  $\xrightarrow{\text{Enzyme(3)}}$  Tyrosine

(D) Tyrosine  $\xrightarrow{\text{Enzyme(4)}}$  Homogentisic acid

(a) Enzyme (A)

(b) Enzyme (B)

(c) Enzyme (C)

(d) Enzyme (D)

150. Which of the following is true about Phenylketonuria?

(a) Mental retardation

(b) Accumulation of phenylalanine and phenylpyruvic acid and other derivatives

(c) Autosomal recessive trait

(d) All the above

151. The substitution of amino acid in the globin protein results due to the single base substitution at the sixth codon of the beta globin gene from.

(a) GAG to GGG

(b) CAG to GAG

(c) GAG to GUG

(d) GGC to GGA

152. Which of the following amino acid is not present in first six amino acids in affected  $\beta$ -chain of Haemoglobin?

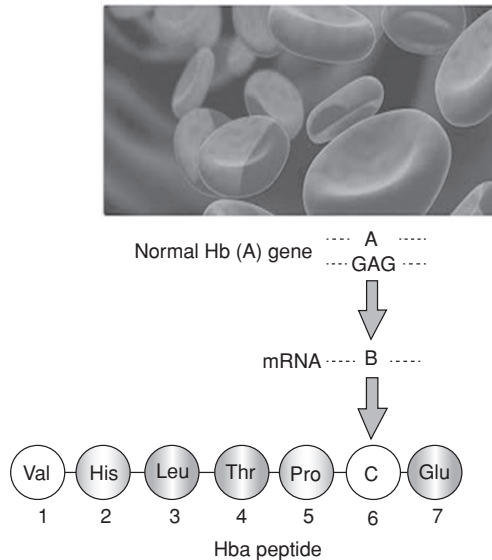
(a) Val

(b) Thr

(c) Glu

(d) Leu

153. Identify A, B and C from the following diagram.



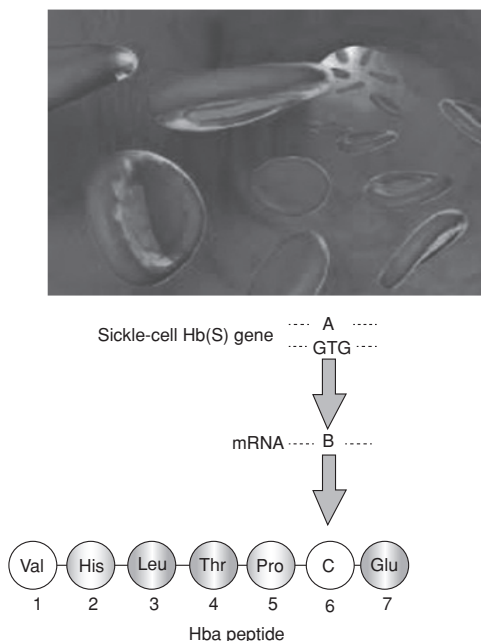
(a) A: CTC; B: GAG; C: Glu

(b) A: GAG; B: CTC; C: Pro

(c) A: CTC; B: GAG; C: Thr

(d) A: CTC; B: GAG; C: Leu


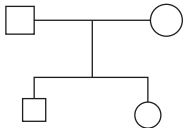
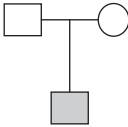
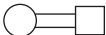
154. Identify A, B and C from the following diagram.



- (a) A: CAC; B: GUG; C: Pro  
 (b) A: CAC; B: GUG; C: Val  
 (c) A: CTC, B: GUG, C: Leu  
 (d) A: GAC, B: GUG, C: His
155. Name the amino acid which has its 2 molecules present in the first 7 amino acid of  $\beta$ -chain of haemoglobin.  
 (a) Val (b) His  
 (c) Leu (d) Glu
156. Probability of which of the following is extremely rare?  
 (a) Carrier female in haemophilia (b) Carrier male in haemophilia  
 (c) Affected male in haemophilia (d) Affected female in haemophilia
157. In hemophilia how many proteins that is a part of the cascade of protein involved in clotting of blood affected?  
 (a) 1 (b) 2  
 (c) 3 (d) Multiple/many
158. Diseased phenotype in sickle cell anaemia is shown by which of the following genotype?  
 (a)  $Hb^A Hb^A$  (b)  $Hb^S Hb^S$   
 (c)  $Hb^A Hb^S$  (d) All of above
159. Variation in DNA is due to  
 (a) Mutation (b) Recombination  
 (c) Both (a) and (b) (d) None of these



160. Alteration in chromosome may be due to  
(a) Deletion of a segment of DNA (b) Addition of segment of DNA  
(c) Duplication of segment of DNA (d) Any of these
161. Deletion or insertion of base pairs of DNA causes  
(a) Point mutation (b) Frameshift mutation  
(c) Transversion (d) All of these
162. Find out the correct statement.  
(a) UV radiation can cause mutation in organism.  
(b) Chromosomal aberration are commonly observed in cancer cells.  
(c) Mutation is a phenomenon which results in the alteration of DNA sequences and results in changes in the genotype and the phenotype of an organism.  
(d) All the above
163. Mutation that arises due to the change in single base pair of DNA is known as  
(a) Point mutation (b) Frameshift mutation  
(c) Silent mutation (d) Recombination
164. A classical example of point mutation is  
(a) Haemophilia (b) Sickle cell anaemia  
(c) Mangolism (d) Cri-du chat syndrome
165. Which of the following disorders is not hereditary?  
(a) Haemophilia (b) Cataract  
(c) Sickle-cell anaemia (d) Colour blindness
166. A pleiotropic gene is one which  
(a) Affects one character (b) Affects more than one characters  
(c) Both (a) and (b) (d) None of these
167. Phenylketonuria is a genetic disorder of  
(a) Trisomic condition (b) Monosomic condition  
(c) Autosomal dominant gene (d) Autosomal recessive gene  
(e) X-linked
168. Which of the following is not X-linked recessive?  
(a) Haemophilia-A (b) Colour blindness  
(c) BETA-Thalassemia (d) G-6 PD deficiency
169. Monosomy and trisomy can be represented as  
(a)  $2n + 1, 2n + 3$  (b)  $2n - 1, 2n - 2$   
(c)  $2n, 2n + 1$  (d)  $2n - 1, 2n + 1$
170. Which result proved that there was no blending in Mendelian Cross?  
(a) Filial<sub>1</sub> progeny of monohybrid cross (b) Filial<sub>2</sub> progeny of dihybrid cross  
(c) Filial<sub>1</sub> progeny of dihybrid cross (d) All of these
171. F<sub>2</sub> progeny of Mendelian monohybrid cross between tall and dwarf plant is made up of  
(a) Tall plant, identical to their parental type  
(b) Dwarf plant, identical to their parental type  
(c) Plant with intermediate light were produced  
(d) Both (a) and (b)

172. Select the incorrect statement.
- Capital letter is used to denote dominant trait.
  - Small letter is used to denote recessive trait.
  - True breeding variety is represented by similar allele pair of gene.
  - Alleles are completely similar forms of the same genes.
173. Punnett was
- Italian botanist
  - British geneticist
  - American geneticist
  - Austrian geneticist
174. What is the genotype ratio of Mendelian monohybrid cross?
- 3 : 1
  - 1 : 2 : 1
  - 1 : 1
  - 3 : 2
175. Mendel found that the  $F_1$  always resembled either one of the parents and that the trait of the other parent was not seen in them. This is due to
- Segregation
  - Dominance
  - Partial dominance
  - Unit factor
176. In monohybrid cross, the proportion of 3 : 1 explains
- Dominance
  - Segregation
  - Both (a) and (b)
  - Unit factor
177. In Morgan's experiment, what will be the percentage of recombination in case of body colour and eye colour?
- 37.2%
  - 1.3%
  - 98.7%
  - 37.2%
178. Which symbol of pedigree is correctly matched?
- Female 
  - Affected offspring 
  - Affected male of autosomal recessive disease 
  - Marriage between relatives 
179. Which of the following was/were applied first time to problems in biology during Mendel's investigations into inheritance?
- Statistical analysis
  - Mathematical logic
  - Computational devices
  - Both (a) and (b)
180. Mendel proposed how many general rules to consolidate his understanding of inheritance in monohybrid cross?
- One
  - Two
  - Three
  - None of the rules, he proposed laws/principles

181. In the theoretical explanation of allelic interaction for dominant and recessive forms, the recessive trait is seen due to the production of  
 (a) Normal or less efficient enzyme (b) A non-functional enzyme  
 (c) No enzyme production (d) Either (b) or (c)
182. Genes responsible for ABO blood group determines which of the following biomolecules of RBC plasma membrane?  
 (a) Phospholipid (b) Proteins (c) Sugars (d) Cholesterols
183. The shape of seed depends on starch granules size; so inheritance of seed shape shows \_\_\_\_\_ relationship, while inheritance of starch grains show \_\_\_\_\_.  
 (a) Dominant recessive, codominance  
 (b) Incomplete dominance, codominance  
 (c) Dominant-recessive, incomplete dominance  
 (d) Codominance, incomplete dominance
184. If yellow body, white eyed drosophila is crossed with wild brown body red eyes drosophila. Then what would be the frequency of recombinants in  $F_1$  generation?  
 (a) 100% (b) 1.3% (c) 98.7% (d) 0%
185. Chromosomal aberrations are commonly observed in  
 (a) Germinal cells (b) Cancer cells (c) Nail base cells (d) Gametes
186. Which of the following cell cycle event is responsible for polyploidy phenomenon?  
 (a) Failure of karyokinesis (b) Failure of cytokinesis  
 (c) Failure of segregation (d) Failure of spindle apparatus
187. Match the following

| Column – I                | Column – II                                    |
|---------------------------|--|
| A. Haemophilia            | 1. Board palm with characteristic palm creased |
| B. Down's syndrome        | 2. Delayed clotting of blood                   |
| C. Klinefelter's syndrome | 3. However feminine development                |
| D. Turner's Syndrome      | 4. Rudimentary ovaries                         |

- (a) A : 1; B : 3; C : 2; D : 4 (b) A : 2; B : 1; C : 3; D : 4  
 (c) A : 4; B : 2; C : 1; D : 3 (d) A : 1; B : 2; C : 3; D : 4
188. Mendel's Law of independent assortment holds good for genes situated on the  
 (a) Non-homologous chromosomes (b) Homologous chromosomes  
 (c) Extra nuclear genetic element (d) Same chromosome
189. Occasionally, a single gene may express more than one effect. The phenomenon is called  
 (a) Multiple allelism (b) Mosaicism  
 (c) Pleiotropy (d) Polygeny
190. In a certain taxon of insects, some have 17 chromosomes and the others have 18 chromosomes. The 17 and 18 chromosome bearing organisms are  
 (a) Males and females, respectively (b) Females and males, respectively  
 (c) All males (d) All females

191. The inheritance pattern of a gene over generations among humans is studied by the pedigree analysis. Character studied in the pedigree analysis is equivalent to  
(a) Quantitative trait (b) Mendelian trait  
(c) Polygenic trait (d) Maternal trait
192. It is said that Mendel proposed that the factor controlling any character is discrete and independent. This proposition was based on the  
(a) Results of  $F_3$  generation of a cross.  
(b) Observations that the offsprings of a cross made between the plants having two contrasting characters show only one character without any blending.  
(c) Self-pollination of  $F_1$  offsprings.  
(d) Cross-pollination of parental generations.
193. Two genes 'A' and 'BA' are linked. In a dihybrid cross involving these two genes, the  $F_1$  heterozygote is crossed with homozygous recessive parental type (aa bb). What would be the ratio of offspring in the next generation?  
(a) 1 : 1 : 1 : 1 (b) 9 : 3 : 3 : 1 (c) 3 : 1 (d) 1 : 1
194. In the  $F_2$  generation of a Mendelian dihybrid cross, the number of phenotypes and genotypes are  
(a) phenotypes-4; genotypes-16 (b) phenotypes-9; genotypes-4  
(c) phenotypes-4; genotypes-8 (d) phenotypes-4; genotypes-9
195. Mother and father of a person with 'O' blood group have 'A' and 'B' blood group, respectively. What would be the genotype of both mother and father?  
(a) Mother is homozygous for 'A' blood group and father is heterozygous for 'B'.  
(b) Mother is heterozygous for 'A' blood group and father is homozygous for 'B'.  
(c) Both mother and father are heterozygous for 'A' and 'B' blood group, respectively.  
(d) Both mother and father are homozygous for 'A' and 'B' blood group, respectively.

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

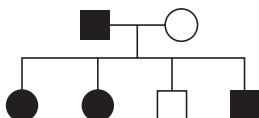
- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.  
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.  
(c) If the assertion is true but the reason is false.  
(d) If both the assertion and reason are false.

196. **Assertion:** Gregor Mendel conducted the hybridization experiment on garden peas and proposed the laws of inheritance in living organism.  
**Reason:** Mendel selected 7 true breeding pea plant varieties.
197. **Assertion:** In a monohybrid cross  $F_1$  generation indicates recessive characters.  
**Reason:** Dominance occurs only in homozygous state.
198. **Assertion:** Gene which code for a pair of contrasting traits are known alleles.  
**Reason:** Alleles are slightly different forms of the same gene.

- 199. Assertion:** The law of dominance is used to explain the expression of only one of the parental character is a monohybrid cross in the  $F_1$  - generation.  
**Reason:** The law of dominance explains the proportion of 3 : 1 obtained at the  $F_2$  - generation.
- 200. Assertion:** Deletions and insertions of base pairs of DNA, causes frame-shift mutation.  
**Reason:** A classical example of frame-shift mutation is sickle cell anaemia.
- 201. Assertion:** Increase in a whole set of chromosome in an organism is known as polyploidy.  
**Reason:** Failure of cytokinesis after telophase stage of cell division results in polyploidy.
- 202. Assertion:** Test cross is a back cross.  
**Reason:** In test cross,  $F_1$ -individual is crossed with recessive parents.
- 203. Assertion:** Inheritance of holandric gene are always from father to son.  
**Reason:** Holandric genes are found on Y-chromosomes.
- 204. Assertion:** In humans, the gamete contributed by the male determines whether the child produced will be male or female.  
**Reason:** Sex in human is a polygenic trait depending upon a cumulative effect of some gene on X-chromosomes and some on Y-chromosomes.
- 205. Assertion:** In birds, the chromosome composition of the sperm determines the sex.  
**Reason:** Male birds are heterogametic.
- 206. Assertion:** Down's syndrome is chromosomal disorder  
**Reason:** It occurs due to trisomy of 21 chromosome.
- 207. Assertion:** Female of Turner's syndrome is sterile.  
**Reason:** Such female contain rudimentary ovaries.
- 208. Assertion:** PKU leads to mental retardation  
**Reason:** Phenylpyruvic acid and their derivatives are accumulated in brain in PKU.
- 209. Assertion:** Sickle cell anaemia is an example of point mutation.  
**Reason:** It occur due change in single nucleotide in beta gene.
- 210. Assertion:** Cystic fibrosis is Mendelian disorder .  
**Reason:** Tuners syndrome is chromosomal disorder.
- 211. Assertion:** Haemophilia is commonly found in males.  
**Reason:** Haemophilia is X- linked recessive disorder.
- 212. Assertion:** UV radiation is mutagen.  
**Reason:** UV radiation can cause mutation in organism.
- 213. Assertion:** Genetic make up of sperm determines the sex of human child.  
**Reason:** Males are homogametic in humans.
- 214. Assertion:** Starch grain size is controlled by gene B in pea seed is an example of incomplete dominance.  
**Reason:** Starch grain formed by genetic constitution Bb is of intermediate size.

## PREVIOUS YEAR QUESTIONS

1. Study the pedigree chart of a certain family given in figure and select the correct conclusion which can be drawn for the character.



[AIPMT MAINS 2010]

- (a) The female parent is heterozygous.  
 (b) The parents could not have had a normal daughter for this character.  
 (c) The trait under study could not be colour blindness.  
 (d) The male parent is homozygous dominant.
2. In *Antirrhinum*, two plants with pink flowers were hybridized. The  $F_1$  plants produced red, pink and white flowers in the proportion of 1 red, 2 pink and 1 white. What could be the genotype of the two plants used for hybridization of Red flower colour is determined by RR, and white by rr genes?

[AIPMT MAINS 2010]

- (a) rrrr (b) RR  
 (c) Rr (d) rr
3. A cross in which an organism showing a dominant phenotype is crossed with the recessive parent in order to know its genotype is called

[AIPMT MAINS 2010]

- (a) Monohybrid cross (b) Back cross  
 (c) Test cross (d) Dihybrid cross
4. ABO blood grouping is controlled by gene I which has three alleles and show co-dominance. There are six genotypes. How many phenotypes in all are possible?

[AIPMT MAINS 2010]





- (a) Six (b) Three  
 (c) Four (d) Five
5. The fruit fly *Drosophila melanogaster* was found to be very suitable for experimental verification of chromosomal theory of inheritance by Morgan and his colleagues because

[AIPMT MAINS 2010]

- (a) It reproduces parthenogenetically.  
 (b) A single mating produces two young flies.  
 (c) Smaller female is easily recognisable from larger male.  
 (d) It completes the life cycle in about two weeks.
6. Which one of the following cannot be explained on the basis of Mendel's Law of Dominance?

[AIPMT PRE 2010]

- (a) The discrete unit controlling a particular character is called a factor.  
 (b) Out of one pair of factors one is dominant and the other recessive.  
 (c) Alleles do not show any blending and both the characters recover as such in  $F_2$  generation.  
 (d) Factors occur in pairs.

7. The genotype of a plant showing the dominant phenotype can be determined by [AIPMT PRE 2010]
- (a) Test cross (b) Dihybrid cross  
(c) Pedigree analysis (d) Back cross
8. ABO blood groups in humans are controlled by the gene I. It has three alleles -  $I^A$ ,  $I^B$  and  $i$ . Since there are three different alleles, six different genotypes are possible. How many phenotypes can occur? [AIPMT PRE 2010]
- (a) Three (b) One  
(c) Four (d) Two
9. Select the correct statement from the ones given below with respect to dihybrid cross. [AIPMT PRE 2010]
- (a) Tightly linked genes on the same chromosome show higher recombinations.  
(b) Genes far apart on the same chromosome shows very few recombinations.  
(c) Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones.  
(d) Tightly linked genes on the same chromosome show very few recombinations.
10. Which one of the following symbols and its representation, used in human pedigree analysis is correct? [AIPMT PRE 2010]
- (a)  = Mating between relatives  
(b)  = Unaffected male  
(c)  = Unaffected female  
(d)  = Male affected
11. Which one of the following conditions correctly describes the manner of determining the sex in the given example? [AIPMT PRE 2011]
- (a) XO type of sex chromosomes determine male sex in grasshopper.  
(b) XO condition in humans as found in Turner syndrome, determines female sex.  
(c) Homozygous sex chromosomes (XX) produce male in *Drosophila*.  
(d) Homozygous sex chromosomes (ZZ) determine female sex in birds.
12. A collection of plants and seeds, having diverse alleles of all the genes of a crop is called [AIPMT PRE 2011]
- (a) Germplasm (b) Gene library  
(c) Genome (d) Herbarium
13. When two unrelated individuals or lines are crossed, the performance of  $F_1$  hybrid is often superior to both its parents. This phenomenon is called [AIPMT PRE 2011]
- (a) Transformation (b) Splicing  
(c) Metamorphosis (d) Heterosis
14. Test cross in plants or in *Drosophila* involves crossing [AIPMT MAINS 2011]

- (a) Between two genotypes with recessive trait  
 (b) Between two  $F_1$  hybrids  
 (c) The  $F_1$  hybrid with a double recessive genotype  
 (d) Between two genotype with dominant trait
15. Which one of the following conditions of the zygotic cell would lead to the birth of a normal human female child?

[AIPMT MAINS 2011]

- (a) Two X chromosomes  
 (b) Only one Y chromosome  
 (c) Only one X chromosome  
 (d) One X and one Y chromosome
16. Read the following four statements (A to D):

[AIPMT MAINS 2012]

- (A) In transcription, adenosine pairs with uracil.  
 (B) Regulation of lac operon by repressor is referred to as positive regulation.  
 (C) The human genome has approximately 50,000 genes.  
 (D) Haemophilia is a sex-linked recessive disease.

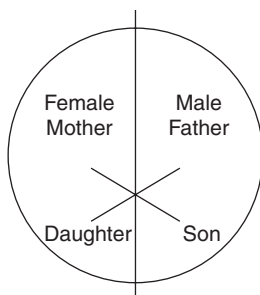
How many of the above statements are right?

- (a) 3  
 (b) 4  
 (c) 1  
 (d) 2
17. A test cross is carried out to

[AIPMT MAINS 2012]

- (a) Predict whether two traits are linked.  
 (b) Assess the number of alleles of a gene.  
 (c) Determine whether two species or varieties will breed successfully.  
 (d) Determine the genotype of a plant at  $F_2$ .
18. Represented below is the inheritance pattern of the certain type of traits in humans. Which one of the following conditions could be an example of this pattern?

[AIPMT MAINS 2012]



- (a) Sickel cell anaemia  
 (b) Haemophilia  
 (c) Thalassemia  
 (d) Phenylketonuria
19. A normal-visioned man whose father was colour blind, marries a women whose father was also colour blind. They have their first child as a daughter. What are the chances that this child would be colour blind?

[AIPMT PRE 2012]

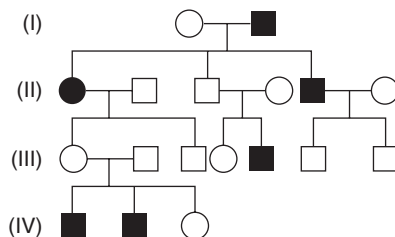
- (a) 100%  
 (b) 0%  
 (c) 25%  
 (d) 50%



20.  $F_2$  generation in a Mendelian cross showed that both genotypic and phenotypic ratios are same as 1 : 2 : 1. It represents a case of [AIPMT PRE 2012]
- (a) Co-dominance
  - (b) Dihybrid cross
  - (c) Monohybrid cross with complete dominance
  - (d) Monohybrid cross with incomplete dominance
21. Which of the following statements is not true of two genes that shows 50 per cent recombination frequency? [AIPMT 2013]
- (a) The genes may be on different chromosomes.
  - (b) The genes are tightly linked.
  - (c) The genes show independent assortment.
  - (d) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis.
22. Variation in gene frequencies within populations can occur by change rather than by natural selection. This is referred to as [AIPMT 2013]
- (a) Genetic flow
  - (b) Genetic drift
  - (c) Random mating
  - (d) Genetic load
23. If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group : 'AB' blood group : 'B' blood group in 1 : 2 : 1 ratio. Modern technique of protein electrophoresis reveals the presence of both 'A' and 'B' type proteins in 'AB' blood group individuals. This is an example of [AIPMT 2013]
- (a) Codominance
  - (b) Incomplete dominance
  - (c) Partial dominance
  - (d) Complete dominance
24. Which Mendelian idea is depicted by a cross in which the  $F_1$  generation resembles both the parents? [AIPMT 2013]
- (a) Incomplete dominance
  - (b) Law of dominance
  - (c) Inheritance of one gene
  - (d) Codominance
25. The incorrect statement with regard to haemophilia is [AIPMT 2013]
- (a) It is a sex-linked disease
  - (b) It is a recessive disease
  - (c) It is a dominant disease
  - (d) A single protein involved in the clotting of blood is affected
26. If both parents are carriers for thalassemia, which is an autosomal recessive disorder, what are the chances of pregnancy resulting in an affected child? [AIPMT 2013]
- (a) No chance
  - (b) 50%
  - (c) 25%
  - (d) 100%

27. Fruit colour in squash is an example of [AIPMT 2014]  
(a) Recessive epistasis (b) Dominant epistasis  
(c) Complementary genes (d) Inhibitory genes
28. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind? [AIPMT 2014]  
(a) 25% (b) 0%  
(c) 50% (d) 75%
29. In a population of 1000 individuals 360 belong to genotype AA, 480 to Aa and the remaining 160 to aa. Based on this data, the frequency of allele A in the population is [AIPMT 2014]  
(a) 0.4 (b) 0.5  
(c) 0.6 (d) 0.7
30. A human female with Turner's syndrome [AIPMT 2014]  
(a) Has 45 chromosomes with XO  
(b) Has one additional X chromosome  
(c) Exhibits male characters  
(d) Is able to produce children with normal husband
31. How many pairs by contrasting characters in pea plants was studied by Mendel in his experiments? [AIPMT 2015]  
(a) 5 (b) 6  
(c) 8 (d) 7
32. The movement of a gene from one linkage group to another is called [AIPMT 2015]  
(a) Inversion (b) Duplication  
(c) Translocation (d) Crossing over
33. Multiple alleles are present [AIPMT 2015]  
(a) On different chromosomes  
(b) At different location in the same chromosome  
(c) At the same locus of the chromosome  
(d) On non-sister chromatids
34. An abnormal human baby with 'XXX' sex chromosomes was born due to [AIPMT 2015]  
(a) Formation of abnormal sperms in the father  
(b) Formation of abnormal ova in the mother  
(c) Fusion of two ova and one sperm  
(d) Fusion two sperms and one ovum
35. Alleles are: [AIPMT 2015]

- (a) Different phenotype  
 (b) True breeding homozygotes  
 (c) Different molecular forms of a gene  
 (d) Heterozygotes
36. A man with blood group 'A' marries a woman with blood group 'B'. which are all the possible blood groups of their offsprings?  
 [AIPMT 2015]  
 (a) A and B only (b) A, B and AB only  
 (c) A, B, AB and O (d) O only
37. In his classic experiments on pea plants, Mendel did not use.  
 [RE-AIPMT 2015]  
 (a) Pod length (b) Seed shape  
 (c) Flower position (d) Seed colour
38. A pleiotropic gene:  
 [RE-AIPMT 2015]  
 (a) Is a gene evolved during Pliocene  
 (b) Controls a trait only in combination with another gene  
 (c) Controls multiple traits in an individual  
 (d) Is expressed only in primitive plants
39. A gene showing codominance has:  
 [RE-AIPMT 2015]  
 (a) Alleles tightly linked on the same chromosome  
 (b) Alleles that are recessive to each other  
 (c) Both alleles independently expressed in the heterozygote  
 (d) One allele dominant on the other
40. A colour blind man marries a woman with normal sight who has no history of colour blindness in her family. What is the probability of their grandson being colour blind?  
 [RE-AIPMT 2015]  
 (a) 1 (b) Nil  
 (c) 0.25 (d) 0.5
41. The term "linkage" was coined by:  
 [RE-AIPMT 2015]  
 (a) T. Boveri (b) G. Mendel  
 (c) W. Sutton (d) T.H. Morgan
42. In the following human pedigree, the filled symbols represent the affected individual. Identify the type of given pedigree.



[RE-AIPMT 2015]

- (a) X-linked recessive (b) Autosomal recessive  
(c) X-linked dominant (d) Autosomal dominant
43. Which of the following most appropriately describes haemophilia? [NEET - I, 2016]  
(a) Recessive gene disorder (b) X-linked recessive gene disorder  
(c) Chromosomal disorder (d) Dominant gene disorder
44. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F<sub>1</sub> plants were selfed the resulting genotypes were in the ratio of: [NEET - I, 2016]  
(a) 1:2:1: Tall homozygous: Tall heterozygous : Dwarf  
(b) 1:2:1: Tall heterozygous: Tall homozygous: Dwarf  
(c) 3 : 1 : : Tall Dwarf  
(d) 3 : 1 : : Dwarf : Tall
45. Match the terms in Column I with their description in Column II and choose the correct option: [NEET - I, 2016]

| Column I                  | Column II   |
|---------------------------|---|
| (a) Dominance             | (i) Many genes govern a single character                                |
| (b) Codominance           | (ii) In a heterozygous organism only one allele expresses itself.       |
| (c) Pleiotropy            | (iii) In a heterozygous organisms both alleles express themselves fully |
| (d) Polygenic inheritance | (iv) A single gene influences many characters                           |

**Options:**

- |     |     |     |     |     |
|-----|-----|-----|-----|-----|
|     | (a) | (b) | (c) | (d) |
| (a) | ii  | i   | iv  | iii |
| (b) | ii  | iii | iv  | i   |
| (c) | iv  | i   | ii  | iii |
| (d) | iv  | iii | i   | ii  |
46. Pick out the correct statements: [NEET - I, 2016]  
(A) Haemophilia is a sex-linked recessive disease.  
(B) Down's syndrome is due to aneuploidy.  
(C) Phenylketonuria is an autosomal recessive gene disorder.  
(D) Sickle cell anaemia is an X-linked recessive gene disorder.  
(a) A and D are correct (b) B and D are correct  
(c) A, C and D are correct (d) A, B and C are correct
47. The amino acid Tryptophan is the precursor for the synthesis of: [NEET - I, 2016]  
(a) Melatonin and Serotonin (b) Thyroxine and Triiodothyronine  
(c) Estrogen and Progesterone (d) Cortisol and Cortisone
48. In a testcross involving F<sub>1</sub> dihybrid flies, more parental-type offspring were produced the recombinant-type offspring. This indicates: [NEET - I, 2016]  
(a) The two genes are located on two different chromosomes  
(b) Chromosomes failed to separate during meiosis

- (c) The two genes are linked and present on the same chromosome  
(d) Both of the characters are controlled by more than one gene
49. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other, dividing cells. This would result in: [NEET - I, 2016]  
(a) Aneuploidy (b) Polyploidy  
(c) Somaclonal variation (d) Polyteny
50. Taylor conducted the experiments to prove semi conservative mode of chromosome replication on [NEET - II, 2016]  
(a) *Vicia faba* (b) *Drosophila melanogaster*  
(c) *E. coli* (d) *Vinca rosea*
51. The mechanism that causes a gene to move from the linkage group to another is called. [NEET - II, 2016]  
(a) Duplication (b) Translocation  
(c) Crossing over (d) Inversion
52. A true breeding plant is [NEET - II, 2016]  
(a) Produced due to cross-pollination among unrelated plants  
(b) Near homozygous and produces offspring of its own kind  
(c) Always homozygous recessive in this genetic constitution  
(d) One that is able to breed on its own
53. If a colour-blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour-blind is [NEET - II, 2016]  
(a) 0.5 (b) 0.75  
(c) 1 (d) 0

---

**NCERT EXEMPLAR QUESTIONS**

---

1. All genes are located on the same chromosome  
(a) Form different groups depending upon their relative distance.  
(b) Form one linkage group.  
(c) Will not form any linkage groups.  
(d) Form interactive groups that affect the phenotype.
2. Conditions of a karyotype  $2n \pm 1$  and  $2n \pm 2$  are called  
(a) Aneuploidy (b) Polyploidy  
(c) Allopolyploidy (d) Monosomy
3. Distance between the genes and percentage of recombination shows  
(a) A direct relationship (b) An inverse relationship  
(c) A parallel relationship (d) No relationship
4. If a genetic disease is transferred from a phenotypically normal but carrier female to only some of the male progeny, then the disease is

- (a) Autosomal dominant (b) Autosomal recessive  
(c) Sex-linked dominant (d) Sex-linked recessive
5. In sickle cell anaemia, the glutamic acid is replaced by valine. Which one of the following are triplet codes for valine?  
(a) G G G (b) A A G  
(c) G A A (d) G U G
6. A person having genotype  $I^A I^B$  would show the blood group as AB. This is because of  
(a) Pleiotropy (b) Co-dominance  
(c) Segregation (d) Incomplete dominance
7. ZZ/ZW type of sex determination is seen in  
(a) Platypus (b) Snails  
(c) Cockroach (d) Peacock
8. A cross between two tall plants resulted in an offspring having few dwarf plants. What would be the genotypes of both the parents?  
(a) TT and Tt (b) Tt and Tt  
(c) TT and TT (d) Tt and tt
9. In a dihybrid cross, if you get 9 : 3 : 3 : 1 ratio, it denotes that  
(a) The alleles of two genes are interacting with each other.  
(b) It is a multigenic inheritance.  
(c) It is a case of multiple allelism.  
(d) The alleles of two genes are segregating independently.
10. Which of the following will not result in variations among siblings?  
(a) Independent assortment of genes (b) Crossing over  
(c) Linkage (d) Mutation
11. Mendel's Law of independent assortment holds good for genes situated on the  
(a) Non-homologous chromosomes  
(b) Homologous chromosomes  
(c) Extra nuclear genetic element  
(d) Same chromosome
12. Occasionally, a single gene may express more than one effect. This phenomenon is called  
(a) Multiple allelism (b) Mosaicism  
(c) Pleiotropy (d) Polygeny
13. In a certain taxon of insects, some have 17 chromosomes and the others have 18 chromosomes. The 17 and 18 chromosome-bearing organisms are  
(a) Males and females, respectively  
(b) Females and males, respectively  
(c) All males  
(d) All females
14. The inheritance pattern of a gene over generations among humans is studied by the pedigree analysis. Character studied in the pedigree analysis is equivalent to  
(a) Quantitative trait (b) Mendelian trait  
(c) Polygenic trait (d) Maternal trait

15. It is said that Mendel proposed that the factor controlling any character is discrete and independent. His proposition was based on the
- Results of  $F_3$  generation of a cross.
  - Observations that the offspring of a cross made between the plants having two contrasting characters show only one character without any blending.
  - Self-pollination of  $F_1$  offsprings.
  - Cross pollination of  $F_1$  generations with recessive parental.
16. Two genes 'A' and 'B' are linked. In a dihybrid cross involving these two genes, the  $F_1$  heterozygote is crossed with homozygous recessive parental type (aa bb). What would be the ratio of offspring in the next generation?
- 1 : 1 : 1 : 1
  - 9 : 3 : 3 : 1
  - 3 : 1
  - 1 : 1
17. In the  $F_2$  generation of a Mendelian dihybrid cross, the number of phenotypes and genotypes are
- Phenotypes-4; genotypes-16
  - Phenotypes-9; genotypes-4
  - Phenotypes-4; genotypes-8
  - Phenotypes-4; genotypes-9
18. Mother and father of a person with 'O' blood group have 'A' and 'B' blood group respectively. What would be the genotype of both mother and father?
- Mother is homozygous for 'A' blood group and the father is heterozygous for 'B'.
  - Mother is heterozygous for 'A' blood group and the father is homozygous for 'B'.
  - Both mother and father are heterozygous for 'A' and 'B' blood group, respectively.
  - Both mother and father are homozygous for 'A' and 'B' blood group, respectively.

### Answer Keys

#### Practice Questions

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (c)   | 2. (d)   | 3. (a)   | 4. (c)   | 5. (a)   | 6. (d)   | 7. (c)   | 8. (a)   | 9. (b)   | 10. (b)  |
| 11. (c)  | 12. (c)  | 13. (b)  | 14. (a)  | 15. (a)  | 16. (a)  | 17. (d)  | 18. (a)  | 19. (b)  | 20. (d)  |
| 21. (d)  | 22. (b)  | 23. (b)  | 24. (a)  | 25. (d)  | 26. (a)  | 27. (c)  | 28. (c)  | 29. (d)  | 30. (d)  |
| 31. (b)  | 32. (b)  | 33. (b)  | 34. (a)  | 35. (b)  | 36. (b)  | 37. (c)  | 38. (a)  | 39. (b)  | 40. (c)  |
| 41. (b)  | 42. (c)  | 43. (b)  | 44. (d)  | 45. (d)  | 46. (a)  | 47. (a)  | 48. (b)  | 49. (a)  | 50. (d)  |
| 51. (b)  | 52. (d)  | 53. (a)  | 54. (d)  | 55. (d)  | 56. (a)  | 57. (b)  | 58. (a)  | 59. (c)  | 60. (c)  |
| 61. (a)  | 62. (d)  | 63. (a)  | 64. (c)  | 65. (c)  | 66. (c)  | 67. (c)  | 68. (b)  | 69. (d)  | 70. (b)  |
| 71. (c)  | 72. (d)  | 73. (b)  | 74. (d)  | 75. (c)  | 76. (d)  | 77. (d)  | 78. (a)  | 79. (b)  | 80. (b)  |
| 81. (a)  | 82. (c)  | 83. (d)  | 84. (c)  | 85. (b)  | 86. (d)  | 87. (a)  | 88. (d)  | 89. (d)  | 90. (c)  |
| 91. (c)  | 92. (b)  | 93. (a)  | 94. (b)  | 95. (c)  | 96. (c)  | 97. (c)  | 98. (a)  | 99. (b)  | 100. (b) |
| 101. (c) | 102. (d) | 103. (c) | 104. (d) | 105. (c) | 106. (c) | 107. (c) | 108. (a) | 109. (c) | 110. (b) |
| 111. (a) | 112. (d) | 113. (d) | 114. (a) | 115. (b) | 116. (d) | 117. (c) | 118. (d) | 119. (a) | 120. (c) |
| 121. (a) | 122. (b) | 123. (c) | 124. (b) | 125. (a) | 126. (c) | 127. (c) | 128. (a) | 129. (b) | 130. (a) |
| 131. (a) | 132. (a) | 133. (a) | 134. (b) | 135. (c) | 136. (b) | 137. (a) | 138. (a) | 139. (c) | 140. (c) |
| 141. (b) | 142. (c) | 143. (a) | 144. (c) | 145. (c) | 146. (d) | 147. (c) | 148. (d) | 149. (c) | 150. (d) |
| 151. (c) | 152. (c) | 153. (a) | 154. (b) | 155. (d) | 156. (d) | 157. (a) | 158. (b) | 159. (c) | 160. (d) |
| 161. (b) | 162. (d) | 163. (a) | 164. (b) | 165. (b) | 166. (b) | 167. (d) | 168. (c) | 169. (d) | 170. (d) |

171. (d) 172. (d) 173. (b) 174. (b) 175. (b) 176. (b) 177. (b) 178. (d) 179. (d) 180. (c)  
181. (d) 182. (c) 183. (c) 184. (d) 185. (b) 186. (b) 187. (b) 188. (a) 189. (c) 190. (a)  
191. (b) 192. (b) 193. (a) 194. (d) 195. (c)

*Assertion and Reason Questions*

196. (c) 197. (d) 198. (a) 199. (b) 200. (c) 201. (b) 202. (a) 203. (a) 204. (b) 205. (d)  
206. (a) 207. (a) 208. (a) 209. (a) 210. (b) 211. (a) 212. (a) 213. (c) 214. (a)

*Previous Year Questions*

1. (a) 2. (c) 3. (c) 4. (c) 5. (d) 6. (c) 7. (a) 8. (c) 9. (d) 10. (a)  
11. (a) 12. (a) 13. (d) 14. (c) 15. (a) 16. (d) 17. (a) 18. (b) 19. (b) 20. (d)  
21. (b) 22. (b) 23. (a) 24. (d) 25. (c) 26. (c) 27. (b) 28. (c) 29. (c) 30. (a)  
31. (d) 32. (c) 33. (c) 34. (b) 35. (c) 36. (c) 37. (a) 38. (c) 39. (c) 40. (b)  
41. (d) 42. (d) 43. (b) 44. (a) 45. (b) 46. (d) 47. (a) 48. (c) 49. (b) 50. (a)  
51. (b) 52. (b) 53. (d)

*NCERT Exemplar Questions*

1. (b) 2. (a) 3. (a) 4. (d) 5. (d) 6. (b) 7. (d) 8. (b) 9. (d) 10. (c)  
11. (b) 12. (c) 13. (a) 14. (b) 15. (b) 16. (d) 17. (d) 18. (c)



*This page is intentionally left blank.*

CHAPTER

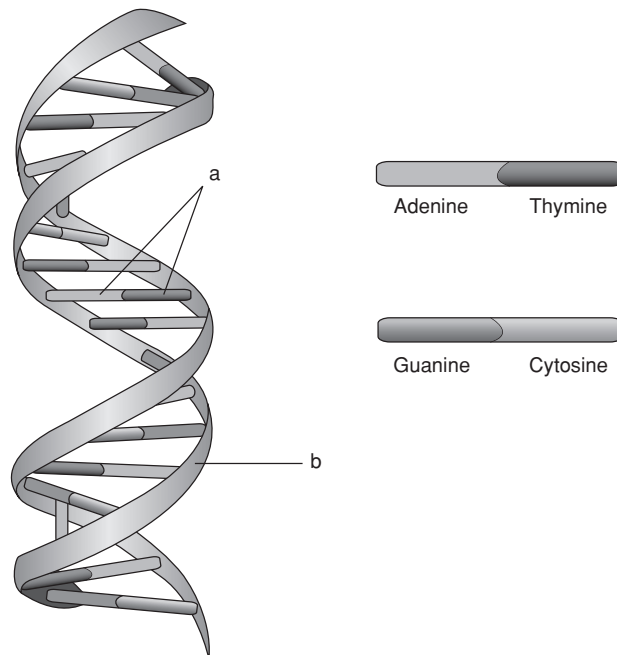
6

# Molecular Basis of Inheritance

PRACTICE QUESTIONS

DNA

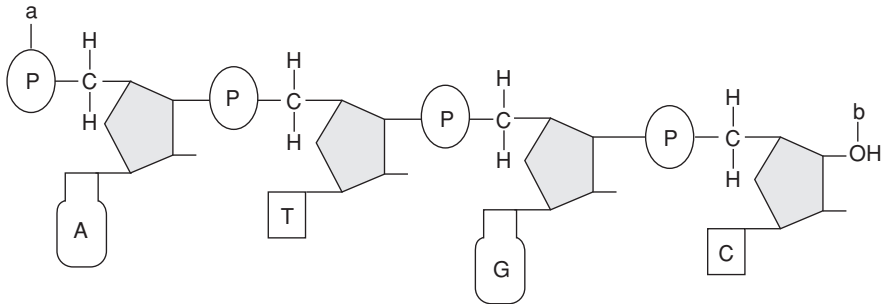
Figure given for questions 1 and 2.



1. What is indicated by 'a' in the figure?
  - (a) Sugar
  - (b) Phosphate
  - (c) Base pairs
  - (d) Singular bases
2. What is indicated by 'b' in the figure?
  - (a) Base pair end
  - (b) Only sugar backbone
  - (c) Only phosphate backbone
  - (d) Both (b) and (c)
3. How many types of nucleic acids are found in living systems?
  - (a) 3
  - (b) 1
  - (c) 2
  - (d) 4

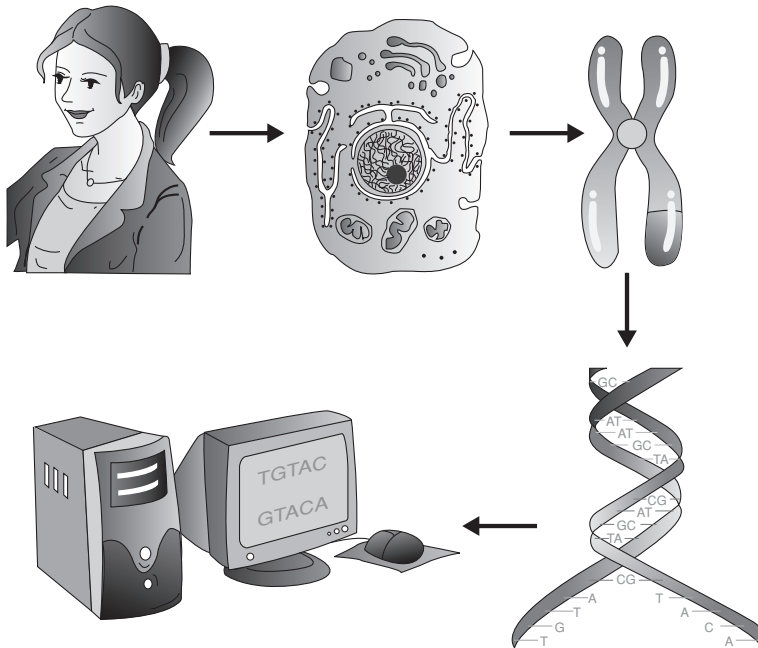
**RNA**

- Which nucleic acid in some viruses can also act as genetic material?  
(a) DNA (b) RNA (c) mRNA (d) tRNA
- The process of making RNA from DNA is termed as  
(a) Transaction (b) Transformation  
(c) Transcription (d) Transduction
- The genetic code  
(a) Is a sequence of nucleotides on rRNA.  
(b) Determines the sequence of amino acid in proteins.  
(c) Is universal in biological systems.  
(d) None of the above
- The process of protein synthesis in biological systems is termed as  
(a) Transaction (b) Transcription  
(c) Translation (d) Transformation
- DNA is a polymer of  
(a) Nucleotides (b) Ribonucleotides  
(c) Nucleosides (d) Deoxyribonucleotides

**Figure given for questions 9–11.**

- What is indicated by 'a' in the figure?  
(a) 5' phosphate (b) 3' phosphate  
(c) Ribose sugar (d) Nitrogen base
- What is indicated by 'b' in the figure?  
(a) 5' phosphate (b) 3' hydroxyl  
(c) Ribose sugar (d) Nitrogen base
- What does the figure represent?  
(a) Polysaccharide (b) Polynucleoside  
(c) Polynucleotide (d) Polyamine
- The length of DNA is defined in terms of  
(a) Number of nucleotides (b) Base pairs  
(c) Both (a) and (b) (d)  $\mu\text{m}$
- A bacteriophage  $\phi \times 174$  has  
(a) 5836 base pairs (b) 5683 nucleotides  
(c) 5386 nucleotides (d) 5638 base pairs

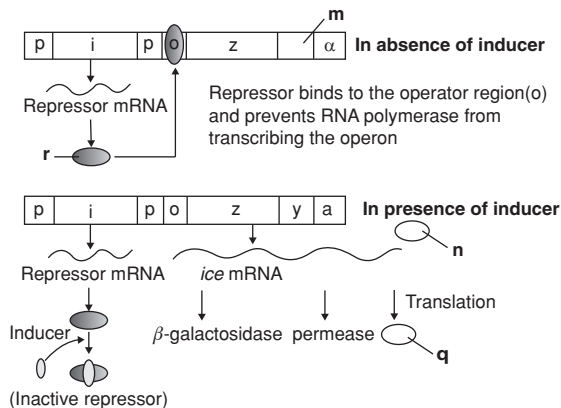
14. Bacteriophage lambda has \_\_\_\_\_ base pairs in nucleic acid (genetic material).  
 (a) 48205 (b) 5386  
 (c) 48502 (d) 45802
15. Which of the following holds true for *Escherichia coli*?  
 (a) *E. coli* has roughly 40 minutes of doubling time.  
 (b) *E. coli* is a parasite in human digestive tract.  
 (c) *E. coli* has  $4.6 \times 10^9$ bp long genetic material.  
 (d) *E. coli* has  $4.6 \times 10^6$ bp long genetic material.
16. A nucleotide has the following components  
 (a) A phosphate group, nitrogenous base, a hexose sugar  
 (b) A phosphorous base, nitrogenous group, a ribose sugar  
 (c) A nitrogenous base, phosphate group, a ribose sugar  
 (d) A nitrogenous base, phosphate group, a hexose sugar
17. Which of the following is not a pyrimidine?  
 (a) Thymine (b) Uracil  
 (c) Adenine (d) Cytosine
18. What is represented by the figure?



- (a) Criminal/Suspect identification (b) Human genome project  
 (c) Recombinant DNA technology (d) Development of Bioinformatics
19. \_\_\_\_\_ is present in DNA only and \_\_\_\_\_ is present in RNA only  
 (a) Cytosine, thymine (b) Thymine, uracil  
 (c) Uracil, thymine (d) Thymine, cytosine

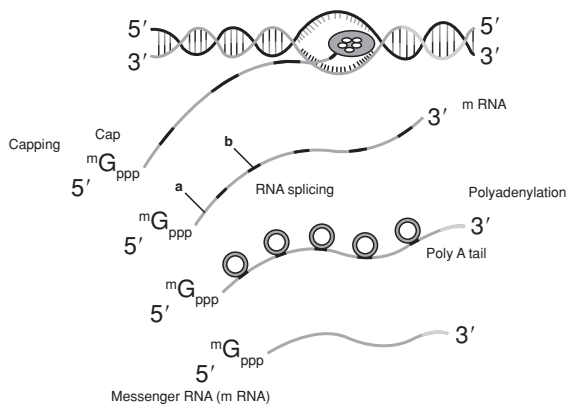
20. A nitrogenous base is linked to the pentose sugar through  
 (a) Phosphoester linkage (b) O-glycosidic linkage  
 (c) Phosphodiester linkage (d) N-glycosidic linkage
21. In the context of genetic material: Base + Sugar →  
 (a) Nucleotide (b) Nucleoside (c) Nucleic acid (d) Nuclein
22. In the context of genetic material, nucleotide consists of  
 (a) N-base, Ribose sugar, Phosphate group (b) N-base, Hexose sugar, Phosphate group  
 (c) Nucleoside + Phosphate (d) Both (a) and (c)
23. Uracil is associated with which sugar?  
 (a) Generally Deoxyribose (b) Sometimes Ribose  
 (c) Only ribose (d) Hexose
24. 5 - end of ribose sugar bears  
 (a) N-base (b) Deoxyribose  
 (c) Phosphate group (d) Hydroxyl group
25. 3' end of the polynucleotide chain bears  
 (a) Phosphate group (b) Hydroxyl group  
 (c) Methyl group (d) Nitro group
26. In RNA, every nucleotide residue has an additional \_\_\_\_\_ group present at \_\_\_\_\_ position of ribose  
 (a)  $\text{PO}_4^{3-}$ , 3' (b)  $\text{OH}^-$ , 3 (c)  $\text{OH}^-$ , 2 (d)  $\text{OH}^-$ , 2'
27. Thymine can also be designated as  
 (a) 3 - Methyl uracil (b) 2 - Methyl uracil  
 (c) 4 - Methyl uracil (d) 5 - Methyl Uracil
28. Friedrich Miescher  
 (a) Identified DNA as a basic substance and named it 'Nucleotide' in 1896.  
 (b) Identified DNA as an acidic substance and named it 'Nuclein' in 1896.  
 (c) Identified DNA as an acidic substance and named it 'Nuclein' in 1869.  
 (d) None of the above

**Figure given for questions 29–32.**



29. What is indicated by 'm' in the figure?  
 (a) y gene (b) o gene  
 (c) z gene (d) a gene
30. What is indicated by 'r' in the figure?  
 (a) Suppressor (b) Operator  
 (c) Repressor (d) Inducer
31. What is indicated by 'n' in the figure?  
 (a) Induction (b) Replication  
 (c) Transcription (d) Derepression
32. What is indicated by 'q' in the figure?  
 (a) Lactase (b) Transacetylase  
 (c)  $\beta$ -galactosidase (d) Permease
33. J. D. Watson and F.H. Crick utilized X-ray diffraction data produced by  
 (a) Rosalind Wilkins and Maurice Franklin (b) Maurice Wilkins and Rosalind Franklin  
 (c) Sutton and Boveri (d) None of these
34. Erwin Chargaff found that  
 (a) Ratios of adenine and cytosine and thymine and guanine are constant.  
 (b) Ratios of adenine and thymine and guanine and cytosine are constant.  
 (c) Ratios of adenine and guanine and thymine and cytosine are constant.  
 (d) Ratios of adenine – guanine and thymine – cytosine are constant.
35. DNA has two strands which are \_\_\_\_\_ to each other.  
 (a) Supplementary (b) Complementary  
 (c) Opposite (d) Perpendicular

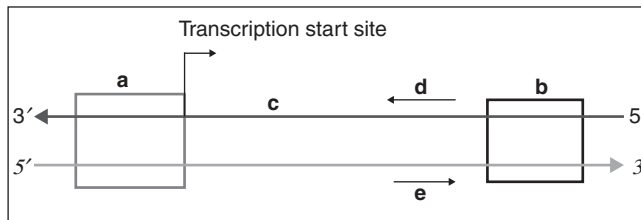
**Figure given for questions 36–37.**



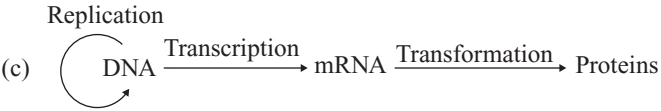
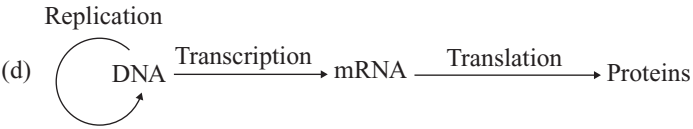
36. What is indicated by 'a' in the figure?  
 (a) Extron (b) Intron (c) Intein (d) Exon
37. What does 'b' represent in the figure?  
 (a) Extron (b) Intron (c) Intein (d) Exon

38. The backbone of DNA double helix consists of  
 (a) Sugar-Base (b) Sugar-Phosphate  
 (c) Sugar-Hydroxyl group (d) Sugar-Methyl group
39. Anti-parallel polarity is exhibited by  
 (a) RNA (b) tRNA  
 (c) mRNA (d) DNA
40. Which of the following holds true in case of DNA?  
 (a)  $A = T$   
 (b) Adenine forms two H-bond with thymine  
 (c) Adenine forms one  $\pi$  bond with thymine  
 (d) Both (a) and (b)
41. Three H-bonds is exhibited by which DNA bases in the double helix structure?  
 (a) Adenine, Guanine (b) Guanine, Cytosine  
 (c) Cytosine, Thymine (d) Adenine, Thymine
42. Double helix model of DNA has a pitch of  
 (a) 0.34 nm (b) 3.4 nm  
 (c) 34 Å (d) Both (b) and (c)
43. Double helix model of DNA proposed by Watson and Crick has how many base pairs in one turn?  
 (a) 9 (b) 11 (c) 12 (d) 10
44. What confers additional stability to double helix model of DNA apart from the H-bond?  
 (a) One base pair provides inductive effect to the other.  
 (b) One base pair is stacked over the other.  
 (c) One base pair is perpendicular to another.  
 (d) One base pair interacts with another base pair via steric hindrance.

**Figure given for questions 45–49.**



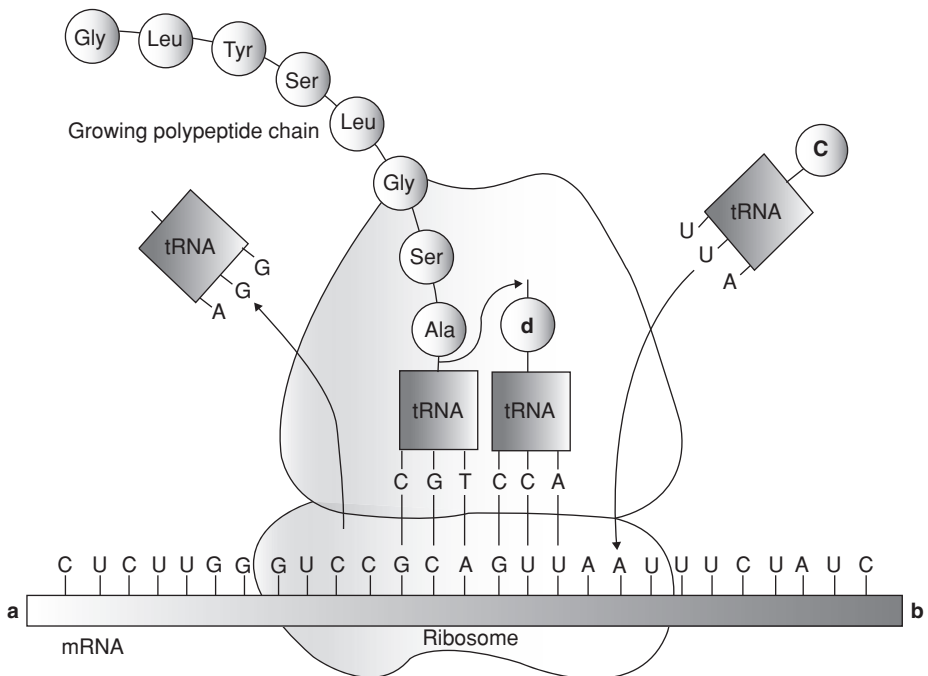
45. What is indicated by 'b' in the figure?  
 (a) Promoter (b) Terminator  
 (c) Structural gene (d) Template strand  
 (e) Coding strand
46. What is indicated by 'e' in the figure?  
 (a) Terminator (b) Structural gene  
 (c) Coding strand (d) Promoter  
 (e) Template strand

47. What does 'd' represent in the figure?  
 (a) Template strand (b) Promoter  
 (c) Terminator (d) Structural gene  
 (e) Coding strand
48. What is indicated by 'a' in the figure?  
 (a) Promoter (b) Terminator  
 (c) Structural gene (d) Template strand  
 (e) Coding strand
49. What does 'c' represent in the figure?  
 (a) Coding strand (b) Template strand  
 (c) Promoter (d) Terminator  
 (e) Structural gene
50. Central dogma in molecular biology was independently proposed by  
 (a) Wilkins (b) Crick  
 (c) Watson (d) Franklin
51. The correct representation of central dogma is as follows:  
 (a) DNA  $\xrightarrow{\text{Transcription}}$  mRNA  $\xrightarrow{\text{Transformation}}$  Protein  
 (b) DNA  $\xrightarrow{\text{Transcription}}$  mRNA  $\xrightarrow{\text{Translation}}$  Proteins  
 (c)   
 (d) 
52. Which of the unusual metabolic process is shown by viruses?  
 (a) DNA to RNA (b) RNA to DNA  
 (c) Proteins to RNA (d) None of these
53. RNA  $\rightarrow$  DNA is termed as  
 (a) Reverse translation (b) Reverse replication  
 (c) Reverse transcription (d) Reverse transformation
54. The length of human DNA is approximately  
 (a) 2.2 meters considering all cells of body (b) 3.1 meters considering only one cell  
 (c) 2.2 meters considering only one cell (d) None of these
55. DNA is held together by which proteins in prokaryotes?  
 (a) Negatively charged proteins (b) Positively charged proteins  
 (c) Amphoteric proteins (d) Histone proteins



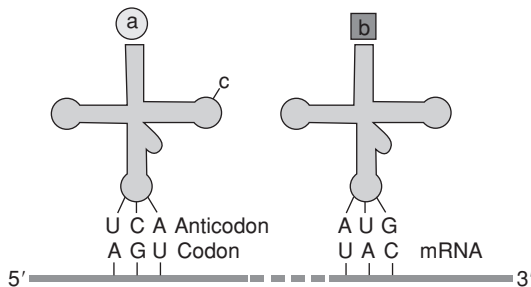
56. Which statement is true in the context of histones?  
 (a) They are positively charged acidic proteins.  
 (b) They are positively charged amphoteric protein.  
 (c) They are positively charged basic proteins.  
 (d) None of the above
57. In a nucleosome, histones are organized in which structure?  
 (a) Octamer (b) Hexamer  
 (c) Decamer (d) Septamer
58. The initial structure formed at the beginning of coiling of DNA around histones is  
 (a) Nuclein (b) Solenoid  
 (c) Nucleosome (d) Chromatin
59. Histones are rich in which amino acid?  
 (a) Methionine, Arginine (b) Lysine, Arginine  
 (c) Lysine, Proline (d) Methionine, Lysine
60. Typically a nucleosome consists of how many base pairs?  
 (a) 190 (b) 200  
 (c) 300 (d) 310
61. Chromatin is made up of  
 (a) Centromere (b) Nucleoid  
 (c) Centrosome (d) Nucleosome

**Figure given for questions 62–65.**



62. Which end of mRNA is shown by 'a' in the figure?  
 (a) 3' (b) 3 (c) 5' (d) 5
63. Which end of mRNA is shown by 'b' in the figure?  
 (a) 5' (b) 5 (c) 3 (d) 3'
64. Which amino acid is shown by 'c' in the figure?  
 (a) Aspartic acid (b) Asparagine  
 (c) Alanine (d) Valine
65. Which amino acid is indicated by 'd' in the figure?  
 (a) Glycine (b) Methionine  
 (c) Alanine (d) Valine
66. 'Beads-on-string' structure can be viewed under  
 (a) Light microscope (b) Compound microscope  
 (c) Confocal laser microscope (d) Electron microscope
67. 'Beads-on-string' structure in chromatin is packaged to form \_\_\_\_\_.  
 (a) Nucleosomes (b) Solenoids  
 (c) Chromatin fibres (d) Chromatids
68. Chromatin fibres coil and condense at \_\_\_\_\_ stage of cell division to form \_\_\_\_\_.  
 (a) Prophase, nucleosomal (b) Telophase, solenoid  
 (c) Metaphase, chromosome (d) Anaphase, chromatid
69. Apart from histones, chromatin at higher level of coiling requires which proteins?  
 (a) Neo histone complex proteins (b) None-histone chromatic proteins  
 (c) Non-histone chromosomal proteins (d) None of these

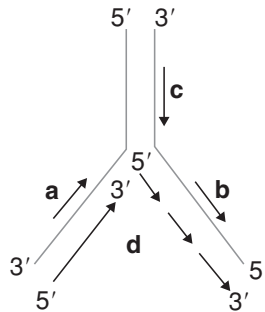
Figure given for questions 70–71.



70. Which protein is indicated by 'a' in the figure?  
 (a) Threonine (b) Serine  
 (c) Tyrosine (d) Methionine
71. Which protein is indicated by 'b' in the figure?  
 (a) Threonine (b) Serine  
 (c) Tyrosine (d) Methionine
72. In the nucleus, the region of chromatin which is loosely packed is known as  
 (a) Heterochromatin (b) Chromatin fibres  
 (c) Euchromatin (d) Chromosome

73. Which is true about the structure of heterochromatin?  
 (a) Loosely packed; Stain light (b) Loosely packed; Stain dark  
 (c) Densely packed; Stain light (d) Densely packed; Stain dark
74. Transformation experiments in search of genetic material were performed by  
 (a) G. J. Mendel (b) T. H. Morgan  
 (c) F. Griffith (d) F. H. Crick
75. Griffith carried out his experiments on mice using which pathogenic bacterium?  
 (a) *Haemophilus influenzae* (b) *Corynebacterium diphtheria*  
 (c) *Streptococcus pneumoniae* (d) *Yersinia pestis*
76. In Griffith's experiment, heat killed S-strain when injected into mice resulted in \_\_\_\_\_.  
 (a) Diseased condition only (b) Death only  
 (c) No disease or death (d) Hybrid formation
77. The transforming principle in Griffith's experiment was detected  
 (a) When live S-strain of *S. pneumoniae* were injected in R-strain.  
 (b) When live R-strain of *S. pneumoniae* were injected in S-strain.  
 (c) When heat killed R-strain of *S. pneumoniae* were injected in S-strain.  
 (d) When heat killed S-strain of *S. pneumoniae* were injected in R-strain.
78. Oswald Avery, Colin MacLeod and Maclyn McCarty (1933 – 44) worked to determine the \_\_\_\_\_ nature of 'transforming principle' in Griffith's experiment.  
 (a) Physical (b) Morphological  
 (c) Structural (d) Biochemical

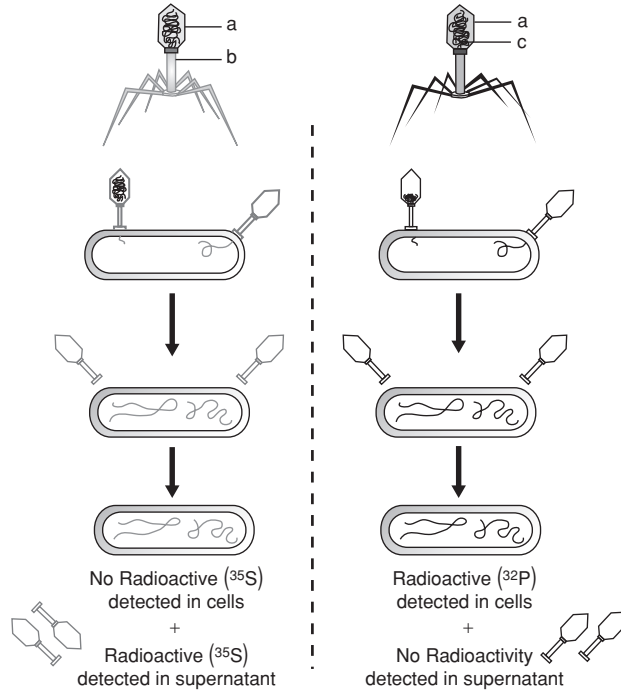
**Figure given for questions 79–82.**



79. What is indicated by 'd' in the figure?  
 (a) Continuous synthesis (b) Newly synthesized strands  
 (c) Template DNA (d) Discontinuous synthesis
80. What does 'b' represent in figure?  
 (a) Template DNA (b) Continuous synthesis  
 (c) Discontinuous synthesis (d) Newly synthesized strands
81. What is indicated by 'a' in the figure?  
 (a) Newly synthesized strands (b) Discontinuous synthesis  
 (c) Template DNA (d) Continuous synthesis

82. What does 'c' represent in the figure?  
(a) Template DNA  
(b) Continuous synthesis  
(c) Discontinuous synthesis  
(d) Newly synthesized strands
83. RNA digesting enzymes are commonly known as  
(a) Ribozymes  
(b) Ribosomes  
(c) RNases  
(d) Ribulose
84. What is the difference between DNAs and DNase?  
(a) Genetic material—DNA digesting enzyme  
(b) DNA digesting enzyme—Genetic material  
(c) Protein—Peptide  
(d) None of these
85. The experiment which provides unequivocal proof that DNA is genetic material and it came from the experiment of  
(a) Watson and Crick  
(b) Wilkins and Franklin  
(c) Hershey and Chase  
(d) Avery, MacLeod and McCarty
86. In the Hershey–Chase experiments the following isotopes were used  
(a)  $^{32}\text{S}$ ,  $^{30}\text{P}$   
(b)  $^{31}\text{S}$ ,  $^{29}\text{P}$   
(c)  $^{35}\text{S}$ ,  $^{32}\text{P}$   
(d)  $^{34}\text{S}$ ,  $^{33}\text{P}$
87. The Hershey–Chase experiments show which of the following steps chronologically?  
(a) Blending, Infection, Centrifugation  
(b) Centrifugation, Infection, Blending  
(c) Infection, Centrifugation, Blending  
(d) Infection, Blending, Centrifugation
88. In Hershey–Chase experiments,  $^{35}\text{S}$  labelled \_\_\_\_\_ and  $^{32}\text{P}$  labelled \_\_\_\_\_ respectively.  
(a) Bacteria, DNA  
(b) DNA, Protein  
(c) Protein, DNA  
(d) DNA, mRNA
89. DNA is a preferred genetic material over RNA due to one of the following reasons  
(a) Bases are arranged linearly in a single strand.  
(b) Bases show less propensity of mutation.  
(c) 2' OH group in RNA is more liable.  
(d) None of the above
90. Which was the first genetic material?  
(a) DNA  
(b) RNA  
(c) Proteins  
(d) None of these
91. 'It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material.' This was a statement of  
(a) Wilkins and Franklin  
(b) Hershey and Chase  
(c) Avery, McCleod, McCarty  
(d) Watson and Crick

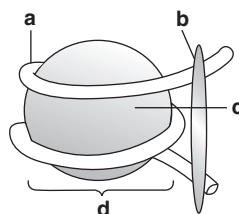
Figure given for questions 92–95.



92. Which experiment is shown in the figure?  
 (a) Griffith's experiment  
 (b) Avery, MacLeod and McCarty  
 (c) Hershey-Chase experiment  
 (d) Meselson and Stahl experiment
93. What is indicated by 'a' in the figure?  
 (a) Bacteriophage  
 (b) Bacterium  
 (c) Lichen  
 (d) Fungus
94. What is indicated by 'b' in the figure?  
 (a)  $^{35}\text{S}$   
 (b)  $^{32}\text{S}$   
 (c)  $^{30}\text{P}$   
 (d)  $^{32}\text{P}$
95. What is indicated by 'c' in the figure?  
 (a)  $^{35}\text{S}$   
 (b)  $^{32}\text{S}$   
 (c)  $^{30}\text{P}$   
 (d)  $^{32}\text{P}$
96. After replication, each DNA molecule has one parental and one newly synthesized strand. This scheme is referred to as  
 (a) Fully conservative  
 (b) Mutation  
 (c) Crossing over  
 (d) Semiconservative
97. Semiconservative replication of DNA was demonstrated by  
 (a) Meselson and Stahl  
 (b) Watson and Crick  
 (c) Hershey and Chase  
 (d) Wilkins and Franklin

98. In Meselson and Stahl experiment, *E. coli* was grown in a medium containing  
(a)  $^{40}\text{KCl}$  (b)  $^{24}\text{NaCl}$   
(c)  $^{15}\text{NH}_4\text{Cl}$  (d)  $\text{CsCl}$
99. In Meselson and Stahl experiment,  $^{15}\text{N}$  can only be differentiated on the basis of  
(a) Radioactivity (b) Radioactive  $t_{1/2}$   
(c) Physical observation (d) Density gradient
100. Taylor and his colleagues used which plant to detect the distribution of newly synthesized DNA?  
(a) *Pisum sativum* (b) *Mirabilis jalapa*  
(c) *Vicia faba* (d) *Triticum aestivum*
101. Taylor and his colleagues used which radioactive probe to detect the distribution of newly synthesized DNA in chromosomes?  
(a) Thymine (b) Adenine  
(c) Guanine (d) Cytosine
102. The process of replication of DNA in *E. coli* requires an enzyme referred to as  
(a) RNA dependent DNA polymerase (b) RNA polymerase  
(c) DNA dependent DNA polymerase (d) DNA ligase
103. *E. coli* completes replication in approximately  
(a) 15 minutes (b) 20 minutes  
(c) 18 minutes (d) 40 minutes
104. Deoxyribonucleotide triphosphate serves the dual purpose of \_\_\_\_\_ and \_\_\_\_\_ in the process of replication of DNA.  
(a) Enzyme, substrate (b) Catalyst, substrate  
(c) Substrate, energy provider (d) Energy, mutagen provider
105. The average rate of polymerization of deoxyribonucleotides in *E. coli* DNA replication process is  
(a) 2500 bp/s (b) 2000 bp/s  
(c) 3000 bp/s (d) 3500 bp/s
106. DNA dependent DNA polymerase catalyses polymerization in \_\_\_\_\_ direction only (in terms of newly synthesized strands).  
(a)  $5' \rightarrow 3'$  (b)  $3' \rightarrow 5'$   
(c)  $5' \rightarrow 3'$  (d)  $3 \rightarrow 5$

**Figure given for questions 107–112.**

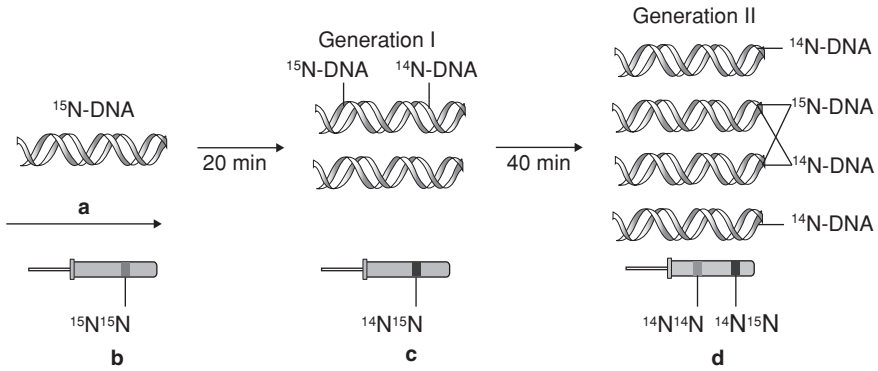


107. The figure shows an essential biomolecule associated with which cell organelle?  
 (a) Endoplasmic reticulum (b) Ribosome  
 (c) Nucleus (d) Golgi complex
108. What is indicated by 'a' in the figure?  
 (a) RNA (b) DNA  
 (c) Histone octamer (d) H1 histone
109. What is indicated by 'b' in the figure?  
 (a) RNA (b) DNA  
 (c) Histone octamer (d) H1 histone
110. What is indicated by 'd' in the figure?  
 (a) Core of histone molecule (b) Part of histone molecule  
 (c) Histone octamer (d) DNA
111. What is indicated by 'c' in the figure?  
 (a) Core of histone molecule (b) Part of histone molecule  
 (c) Histone octamer (d) DNA
112. The whole structure indicated in the figure is of \_\_\_\_\_.  
 (a) Chromosome (b) Nucleolus  
 (c) Nucleosome (d) Proteasome
113. Discontinuously synthesized strands of DNA adjacent to \_\_\_\_\_ DNA template are joined together by \_\_\_\_\_.  
 (a)  $5' \rightarrow 3'$ , DNA endonuclease (b)  $3' \rightarrow 5'$ , DNAase  
 (c)  $5' \rightarrow 3'$ , DNA ligase (d)  $5' \rightarrow 3'$ , DNA ligase
114. During which phase of the cell cycle does replication of DNA takes place in eukaryotes?  
 (a)  $G_1$  (b)  $G_0$   
 (c) S (d)  $G_2$

### Transcription

115. The process of copying genetic information from DNA to RNA is known as  
 (a) Translation (b) Transduction  
 (c) Transcription (d) Transformation
116. The product of transcription process is in fact  
 (a) Entire segment of DNA copied to RNA (b) Only segment of DNA copied to RNA  
 (c) Both (a) and (b) (d) None of these
117. In the process of transcription, the strand of DNA with polarity \_\_\_\_\_ acts as a \_\_\_\_\_ strand.  
 (a)  $5' \rightarrow 5'$ , Coding strand (b)  $3' \rightarrow 5'$  Template strand  
 (c)  $3' \rightarrow 3'$ , Coding strand (d)  $5' \rightarrow 3'$ , Template strand
118. The promoter and \_\_\_\_\_ flank the structural gene in a transcription unit.  
 (a) Structure (b) Regulator (c) Operator (d) Terminator
119. A segment of DNA coding for a polypeptide is termed as  
 (a) Intron (b) Exon (c) Cistron (d) Distron

Figure given for questions 120–124.

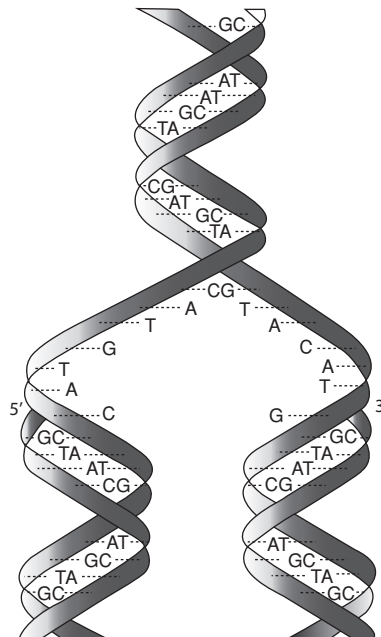


(Separation of DNA by Centrifugation)

120. Which experiment is shown in the figure?  
 (a) Griffith's experiment  
 (b) Hershey and Chase experiment  
 (c) Meselson and Stahl experiment  
 (d) Watson and Crick experiment
121. What is indicated by 'a' in the figure?  
 (a) Centrifugal force  
 (b) Centripetal force  
 (c) Gravitational force  
 (d) Radioactive force
122. What is indicated by 'b' in the figure?  
 (a) Heavy  
 (b) Hybrid  
 (c) Light  
 (d) Heavy hybrid
123. What is indicated by 'c' in the figure?  
 (a) Heavy  
 (b) Hybrid  
 (c) Light  
 (d) Heavy hybrid
124. What is indicated by 'd' in the figure?  
 (a) Hybrid  
 (b) Light and hybrid  
 (c) Heavy and hybrid  
 (d) Heavy and light
125. The coding sequences of DNA are known as \_\_\_\_\_ and the intervening sequences are known as \_\_\_\_\_ respectively.  
 (a) Exon, intron  
 (b) Intron, exon  
 (c) Cistron, exon  
 (d) Exon, cistron
126. In bacteria, which of the following plays a structural and catalytic role in the translation process?  
 (a) mRNA  
 (b) rRNA  
 (c) tRNA  
 (d) DNA
127. What are the components required for the initiation of transcription in bacteria?  
 (a) RNA polymerase only  
 (b) Promoter, RNA polymerase and  $\rho$ -factor  
 (c)  $\rho$  factor only  
 (d)  $\sigma$  factor only



128.  $\rho$ -factor in the process of transcription in bacteria is also known as  
 (a) Initiation factor (b) Elongation factor  
 (c) Termination factor (d) Vital factor
129. In bacteria, in context of mRNA, which of the following is not true?  
 (a) Transcription and translation takes place in different compartment.  
 (b) Post-transcriptional modifications are required like splicing.  
 (c) Translation occurs only after transcription.  
 (d) All the above
130. The total number of RNA polymerase found in eukaryotes is  
 (a) 3 (b) 4 (c) 2 (d) 5
131. Which of the following RNA is transcribed by RNA polymerase II in eukaryotes?  
 (a) tRNA (b) rRNA (c) snRNA (d) hnRNA
132. RNA polymerase I transcribes \_\_\_\_\_ in eukaryotes.  
 (a) tRNA (b) rRNA (c) snRNA (d) hnRNA
133. In eukaryotes, RNA polymerase III is responsible for synthesis of  
 (a) 28S RNA, 18S RNA and 5.8S RNA (b) tRNA, hnRNA, rRNA  
 (c) tRNA, 5sRNA, snRNA (d) hnRNA, tRNA, rRNA
134. The intervening sequences in the primary transcript of mRNA are removed by  
 (a) Recombination (b) Linkage (c) Capping (d) Splicing
135. Additional post-transcriptional processing like capping and tailing is characteristic to  
 (a) rRNA (b) hnRNA (c) snRNA (d) tRNA
136. Which classical model proposed by Watson and Crick is represented by this figure?



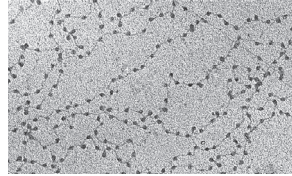
- (a) Fully conservative DNA transcription      (b) Semi-conservative RNA replication  
(c) Semi-conservative DNA replication      (d) Non-conservative DNA replication
137. In a post-transcriptional modification, capping adds an unusual nucleotide like  
(a) Guanosine triphosphate      (b) Methyl guanine triphosphate  
(c) Methyl guanosine triphosphate      (d) Adenosine triphosphate
138. In a post-transcriptional modification called tailing, \_\_\_\_\_ residues are added at the \_\_\_\_\_ of mRNA.  
(a) Adenylate, 5'- end      (b) Guanylate, 3'- end  
(c) Adenylate, 3'- end      (d) Guanylate, 5'- end
139. mRNA is in fact  
(a) Unprocessed rRNA      (b) Unprocessed hnRNA  
(c) Processed hnRNA      (d) Processed mRNA itself

### Genetic Code

140. A physicist, George Gamow, argued that genetic code is a combination of \_\_\_\_\_ nucleotides.  
(a) 3      (b) 2  
(c) 4      (d) 1
141. Humans requires \_\_\_\_\_ codons to synthesize 20 amino acids.  
(a) 64 codons      (b) 61 codons  
(c) 62 codons      (d) 60 codons
142. The chemical method developed by \_\_\_\_\_ was instrumental in synthesizing RNA molecules with defined combination of bases.  
(a) Marshall Nirenberg      (b) George Gamow  
(c) Har Gobind Khorana      (d) F. H. C. Crick
143. \_\_\_\_\_ cell-free system for protein synthesis finally helped the genetic code to be deciphered.  
(a) George Gamow's      (b) Marshall Nirenberg's  
(c) Har Gobind Khorana's      (d) J. D. Watson's
144. Some amino acids are coded by more than one codon. Hence the genetic code exhibits  
(a) Specificity      (b) Selectivity  
(c) Degeneracy      (d) Regenerancy
145. The codon AUG has dual function as it codes for \_\_\_\_\_ and also acts as a \_\_\_\_\_ codon.  
(a) Phenylalanine, initiator      (b) Methionine, terminator  
(c) Methionine, regulator      (d) Methionine, initiator
146. Sickle cell anaemia is a classic example of  
(a) Frame shift mutation      (b) Point mutation  
(c) Deletion mutation      (d) Duplication mutation
147. In sickle cell anaemia, which amino acid modification occurs in the  $\beta$ -chain of amino acid?  
(a) Valine  $\rightarrow$  Glutamate      (b) Threonine  $\rightarrow$  Valine  
(c) Tyrosine  $\rightarrow$  Glutamate      (d) Glutamate  $\rightarrow$  Valine
148. tRNA was earlier called  
(a) Adapter molecule      (b) Special RNA  
(c) Protein carrying RNA      (d) Soluble RNA

149. For the initiation of translation process, specific tRNAs involved are known as
- |                    |                   |
|--------------------|-------------------|
| (a) Helper tRNA    | (b) Assistor tRNA |
| (c) Initiator tRNA | (d) Terminal tRNA |

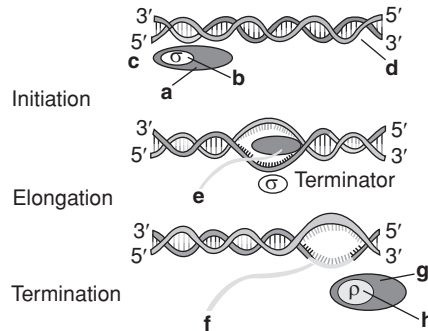
**Figure given for questions 150 and 151.**



150. The picture is taken using \_\_\_\_\_ microscope.
- |                    |                  |
|--------------------|------------------|
| (a) Phase contrast | (b) Electron     |
| (c) Bright field   | (d) Fluorescence |
151. The picture shows characteristic coiling of DNA known as \_\_\_\_\_.
- |                      |                      |
|----------------------|----------------------|
| (a) Strings-on-beads | (b) beads-on-strings |
| (c) Nanobead coiling | (d) None of these    |
152. The process of polymerization of amino acids to polypeptide is known as
- |                          |                    |
|--------------------------|--------------------|
| (a) Pepto-polymerization | (b) Transcription  |
| (c) Translation          | (d) Transformation |
153. Charging of tRNA is also known as
- |                      |                    |
|----------------------|--------------------|
| (a) Acylation        | (b) Transamination |
| (c) Amine Alkylation | (d) Aminoacylation |
154. tRNA for serine bears anticodon \_\_\_\_\_.
- |         |         |         |         |
|---------|---------|---------|---------|
| (a) AUG | (b) UAC | (c) UCA | (d) UGA |
|---------|---------|---------|---------|
155. The structure of tRNA resembles which leaf?
- |           |            |
|-----------|------------|
| (a) Olive | (b) Neem   |
| (c) Clove | (d) Clover |
156. Ribosomes are the cellular factory for synthesis of \_\_\_\_\_.
- |                   |             |
|-------------------|-------------|
| (a) Carbohydrates | (b) Enzymes |
| (c) Proteins      | (d) Lipids  |
157. Ribozyme in bacteria is \_\_\_\_\_ rRNA.
- |         |         |         |         |
|---------|---------|---------|---------|
| (a) 30S | (b) 32S | (c) 23S | (d) 21S |
|---------|---------|---------|---------|
158. Additional sequences on mRNA referred to as \_\_\_\_\_ are not translated.
- |                                    |                          |
|------------------------------------|--------------------------|
| (a) Variable number tandem repeats | (b) Non coding sequence  |
| (c) Untranscribed regions          | (d) Untranslated regions |
159. In Eukaryotes, which of the following mechanisms is not correct in terms of regulation of gene expression?
- |   |
|---|
| (a) Transcription                               |
| (b) Splicing                                    |
| (c) Transport of mRNA from cytoplasm to nucleus |
| (d) Translation                                 |

160.  $\beta$ -galactosidase is synthesized by *E. coli* to catalyze hydrolysis of \_\_\_\_\_ into \_\_\_\_\_ and glucose.  
 (a) Galactose, lactose (b) Galactose, glucose  
 (c) Lactose, galactose (d) Maltose, galactose
161. Lac operon was elucidated by  
 (a) Watson, Crick (b) Jacob, Monod  
 (c) Johansson (d) Miescher
162. A polycistronic structural gene is regulated by a common promoter and regulator gene in bacteria and is commonly termed as  
 (a) Codon (b) Operon (c) Genetic code (d) None of these
163. Regulatory gene 'I' in lac operon is  
 (a) Inducer (b) Inhibitor (c) Structure (d) Initiator

**Figure given for questions 164–166.**



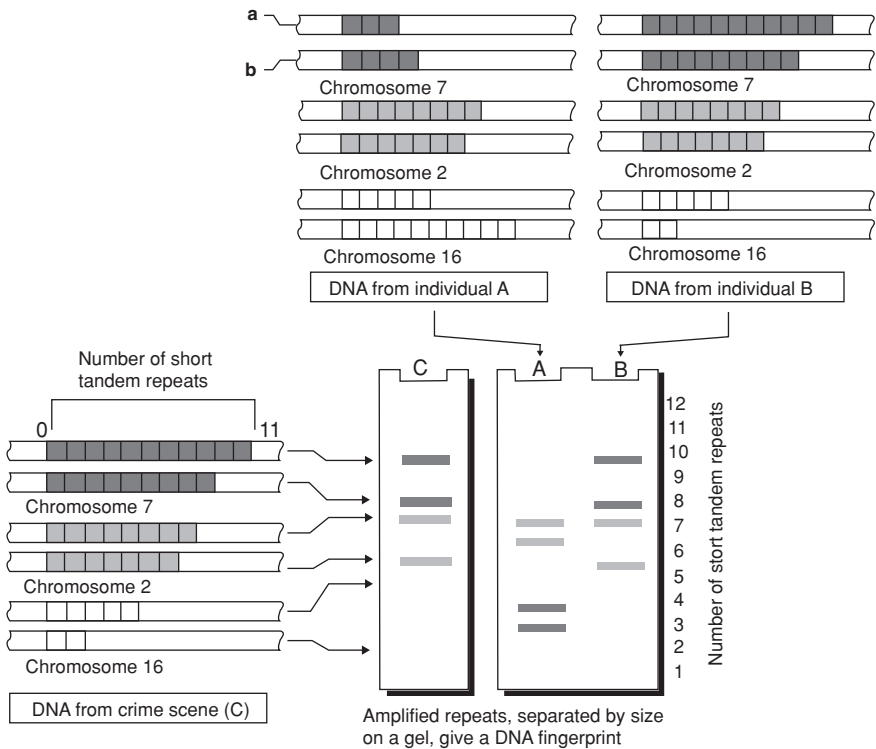
164. What is indicated by 'd' in the figure?  
 (a) RNA polymerase (b) DNA helix  
 (c) Sigma factor (d) Promoter
165. What is indicated by 'b' in the figure?  
 (a) Sigma factor (b) RNA  
 (c) DNA helix (d) Promoter
166. What does 'h' represent in the figure?  
 (a) RNA polymerase (b) RNA  
 (c) Promoter (d) Rho factor
167. Out of the 3 structural genes z, y and a, the gene (s) which gene of *E. coli* lac Operon code for permease?  
 (a) z (b) s (c) y (d) Both (b) and (c)
168. Repressor protein in lac operon concept binds to which gene?  
 (a) d (b) i (c) o (d) z
169. In lac operon, the inducer binds to \_\_\_\_\_ to initiate the synthesis of enzymes responsible for lactose metabolism.  
 (a) i gene (b) Repressor (c) O gene (d) Z gene

170. Lac operon operates in *E. Coli* \_\_\_\_\_.  
 (a) Occasionally (b) Frequently (c) All time (d) Sometimes
171. Generally the regulation of lac operon by repressor is referred to as \_\_\_\_\_ regulation.  
 (a) Positive (b) Negative  
 (c) Feedback (d) Both (b) and (c)

**Human Genome Project**

172. Considering the cost of sequencing 1 bp to be US \$3, the approximate cost of HGP (Human Genome Project) would come out to be \_\_\_\_\_.  
 (a) 3 billion (b) 9 million (c) 9 billion (d) 3 million

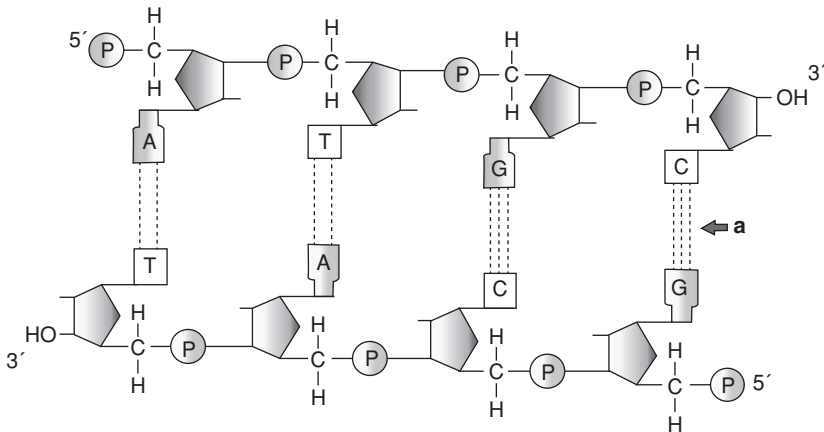
**Figure given for questions 173 and 174.**



173. What is indicated by 'a' in the figure?  
 (a) Maternal chromosome (b) Paternal chromosome  
 (c) Foetal chromosome (d) Sister chromosome
174. What is indicated by 'b' in the figure?  
 (a) Maternal chromosome (b) Paternal chromosome  
 (c) Foetal chromosome (d) Sister chromosome
175. HGP was closely associated with the rapid development of \_\_\_\_\_.  
 (a) Chemo informatics (b) Modern genetics  
 (c) Pharmaco informatics (d) Bioinformatics



188. If inheritable mutation is observed in a population at high frequency, it is termed as  
 (a) DNA mutation (b) DNA isomerism  
 (c) DNA polymorphism (d) None of these
189. The technique of \_\_\_\_\_ was discovered by Alec Jeffreys.  
 (a) DNA culture (b) DNA modification  
 (c) DNA mutation (d) DNA fingerprinting
190. A well-known technique to amplify a small portion of DNA is termed as  
 (a) PCR (b) VNTR  
 (c) UTR (d) EST
191. VNTRs vary in size from \_\_\_\_\_ to \_\_\_\_\_.  
 (a) 0.1 to 20 bases (b) 0.1 to 20 kilobases  
 (c) 0.1 to 20 hectobases (d) 0.1 to 20 decabases
192. Similar DNA finger printing is obtained for  
 (a) Dizygotic twins (b) Monozygotic twins  
 (c) Polyzygotic twins (d) None of these
193. In DNA fingerprinting, the hybridized strands are detected by  
 (a) Radiometry (b) Radioscopy  
 (c) Autoradiography (d) Scintillation counter
194. Under HGP, the largest known human gene was of  
 (a) Somatotropin (b) Dystrophin  
 (c) Insulin (d) Somatostatin
195. What is indicated by 'a' in figure?



- (a) H-bond (b) Ionic bond  
 (c) Covalent bond (d) Van der Waals bond

## ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

196. **Assertion:** DNA act as the genetic material in most of the organisms.  
**Reason:** DNA is chemically and structurally a stable molecule; it has the power of replication.
197. **Assertion:** In RNA, the uracil is found at the place of thymine.  
**Reason:** 5 – methyl uracil is the chemical name for thymine.
198. **Assertion:** There is uniform distance between two strands of DNA.  
**Reason:** Purine always comes opposite to pyrimidine.
199. **Assertion:** Chargaff rule is applicable to RNA.  
**Reason:** RNA is a double standard molecule.
200. **Assertion:** Viruses having shorter life span, mutate and evolve faster.  
**Reason:** Viruses have generally RNA genome.
201. **Assertion:** RNA was the first genetic material.  
**Reason:** Essential life processes (such as metabolism, translation, splicing, etc.) evolve around RNA.
202. **Assertion:** UTRs are present at both 5' end and 3' end in mRNA.  
**Reason:** UTRs are required for efficient translation process.
203. **Assertion:** DNA polymerase-I acts as proofreader.  
**Reason:** DNA polymerase-I removes mismatched nucleotides.
204. **Assertion:** The genetic codes are commaless.  
**Reason:** Genetic codes are overlapping.
205. **Assertion:** Cytoplasmic inheritance occurs only due to plasmagenes.  
**Reason:** Plasmagenes are restricted to only nucleus.
206. **Assertion:** Enzymes required for DNA replication are efficient enzymes  
**Reason:** They can polymerise large number of nucleotides in very short time.
207. **Assertion:** DNA replication occurs within a small opening of the DNA helix .  
**Reason:** DNA can not be separated in its entire length due to very high energy requirement.
208. **Assertion:** A piece of DNA if propagated through recombinant DNA procedures requires a vector.  
**Reason:** Vector provides origin of replication.



- 209. Assertion:** A failure in cell division results into polyploidy.  
**Reason:** Polyploidy is a chromosomal anomaly.
- 210. Assertion:** Both the strands of DNA are not copied during process of transcription.  
**Reason:** The two molecules of RNA complementary to each other form the double stranded RNA and this would prevent RNA from being translated into protein.
- 211. Assertion:** Gene in eukaryote are said to be split.  
**Reason:** Exons (coding sequences) and introns (intervening sequences) form the gene.
- 212. Assertion:** Lactose is inducer in Lac operon.  
**Reason:** Glucose acts as repressor.
- 213. Assertion:** Polymorphism in DNA sequence is the basis of DNA fingerprinting.  
**Reason:** Polymorphism arises due to mutation.
- 214. Assertion:** DNA caused the transformation.  
**Reason:** Digestion with DNase inhibits transformation.

---

### PREVIOUS YEAR QUESTIONS

---

1. In eukaryotic cell transcription, RNA splicing and RNA capping takes place inside the [AIPMT MAINS 2010]  
(a) Ribosomes (b) Nucleus  
(c) Dictyosomes (d) Endoplasmic Reticulum
2. Which one of the following statements about the particular entity is true? [AIPMT MAINS 2010]  
(a) Centromere is found in animal cells, which produces aster during cell division.  
(b) The gene for producing insulin is present in everyone's cell.  
(c) Nucleosome is formed of nucleotides.  
(d) DNA consists of core of eight histones.
3. The lac operon consists of [AIPMT MAINS 2010]  
(a) Four regulatory genes only.  
(b) One regulatory gene and three structural genes.  
(c) Two regulatory genes and two structural genes.  
(d) Three regulatory genes and three structural genes.
4. The 3' – 5' phosphodiester linkages inside a polynucleotide chain serve to join [AIPMT MAINS 2010]  
(a) One DNA strand with the other DNA strand.  
(b) One nucleoside with another nucleoside.  
(c) One nucleotide with another nucleotide.  
(d) One nitrogenous base with pentose sugar.
5. Select the two statements out of the four (1 to 4) given below about lac operon. [AIPMT PRE 2010]

- (1) Glucose or galactose may bind with the repressor and inactivate it.
- (2) In the absence of lactose, the repressor binds with the operator region.
- (3) The z-gene codes for permease
- (4) This was elucidated by Francois Jacob and Jacques Monod.

The correct statements are

- (a) (3) and (3)                      (b) (1) and (3)                      (c) (2) and (4)                      (d) (1) and (2)
6. The one aspect which is not a salient feature of genetic code is its being [AIPMT PRE 2010]
- (a) Degenerate    (b) Ambiguous  
(c) Universal    (d) Specific
7. Satellite DNA is a useful tool in [AIPMT PRE 2010]
- (a) Organ transplantation    (b) Sex determination  
(c) Forensic science    (d) Genetic engineering
8. Which one of the following does not follow the central dogma of molecular biology? [AIPMT PRE 2010]
- (a) Pea    (b) Mucor  
(c) Chlamydomonas    (d) HIV
9. What are those structures that appear as 'beads-on-string' in the chromosomes when viewed under electron microscope? [AIPMT PRE 2011]
- (a) Nucleotides    (b) Nucleosomes  
(c) Base pairs    (d) Genes
10. Which one of the following also acts as a catalyst in a bacterial cell? [AIPMT PRE 2011]
- (a) snRNA    (b) hnRNA  
(c) 23S rRNA    (d) 5 S rRNA
11. The unequivocal proof of DNA as the genetic material came from the studies on a [AIPMT MAINS 2011]
- (a) Bacterium    (b) Fungus  
(c) Viroid    (d) Bacterial virus
12. In the history of biology, the human genome project led to the development of [AIPMT MAINS 2011]
- (a) Biotechnology    (b) Biomonitoring  
(c) Bioinformatics    (d) Biosystematics
13. What is it that forms the basis of DNA Fingerprinting? [AIPMT MAINS 2012]
- (a) The relative difference in the DNA occurrence in blood, skin and saliva.  
(b) The relative amount of DNA in the ridges and grooves of the fingerprints.  
(c) Satellite DNA occurring as highly repeated short DNA segments.  
(d) The relative proportions of purines and pyrimidines in DNA.

14. Companion cells are closely associated with [AIPMT PRE 2012]  
 (a) Sieve elements (b) Vessel elements  
 (c) Trichomes (d) Guard cells
15. Removal of RNA polymerase III from nucleoplasm will affect the synthesis of [AIPMT PRE 2012]  
 (a) tRNA (b) hnRNA  
 (c) mRNA (d) rRNA
16. PCR and Restriction Fragment Length Polymorphism are the methods for [AIPMT PRE 2012]  
 (a) Study of enzymes (b) Genetic transformation  
 (c) DNA sequencing (d) Genetic fingerprinting
17. Which one of the following is not a part of a transcription unit in DNA? [AIPMT PRE 2012]  
 (a) The inducer (b) A terminator  
 (c) A promoter (d) The structural gene
18. A single strand of nucleic acid tagged with a radioactive molecule is called [AIPMT PRE 2012]  
 (a) Vector (b) Selectable marker  
 (c) Plasmid (d) Probe
19. If one strand of DNA has the nitrogenous base sequence as ATCTG, then what would be the complementary RNA strand sequence? [AIPMT PRE 2012]  
 (a) TTAGU (b) UAGAC  
 (c) AACTG (d) ATCGU
20. Removal of introns and joining of exons in a defined order during transcription is called [AIPMT PRE 2012]  
 (a) Looping (b) Inducing  
 (c) Slicing (d) Splicing
21. The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C [AIPMT 2013]
- ```

    graph LR
      DNA((DNA)) -- A --> mRNA[mRNA]
      mRNA -- B --> protein[protein]
      protein --- C[Proposed by C]
  
```
- (a) A: transcription B: protein C: James Watson  
 (b) A: translation B: transcription C: Erwin Chargaff  
 (c) A: transcription B: translation C: Francis Crick  
 (d) A: translation B: Extension C: Rosalind Franklin
22. Which enzyme/s will be produced in a cell in which there is a nonsense mutation in the lac Y gene? [AIPMT 2013]  
 (a)  $\beta$ -galactosidase (b) Lactose permease  
 (c) Transacetylase (d) Lactose permease and transacetylase

23. Which one of the following is wrongly matched? [AIPMT 2014]
- (a) Transcription – Writing information from DNA to tRNA.
  - (b) Translation – Using information in mRNA to make protein.
  - (c) Repressor protein – Binds to operator to stop enzyme synthesis.
  - (d) Operon – Structural genes, operator and promoter.
24. Transformation was discovered by [AIPMT 2014]
- (a) Meselson and Stahl
  - (b) Hershey and Chase
  - (c) Griffith
  - (d) Watson and Crick
25. An analysis of chromosomal DNA using the Southern hybridization technique does not use [AIPMT 2014]
- (a) Electrophoresis
  - (b) Blotting
  - (c) Autoradiography
  - (d) PCR
26. Select the correct option: (A: Direction RNA synthesis, B: Direction of reading of the template DNA strand) [AIPMT 2014]
- (a) 5' ---- 3'      3' ---- 5'
  - (b) 3' ---- 5'      5' ---- 3'
  - (c) 5' ---- 3'      5' ---- 3'
  - (d) 3' ---- 5'      3' ---- 5'
27. The commonly used vectors for human genome sequencing are [AIPMT 2014]
- (a) T-DNA
  - (b) BAC and YAC
  - (c) Expression vectors
  - (d) T/Cloning vectors
28. Gene regulation governing lactose operon of *E. coli* that involves the *lacI* gene product is [AIPMT 2015]
- (a) Positive and inducible because it can be induced by lactose.
  - (b) Negative and inducible because repressor protein prevents transcription.
  - (c) Negative and repressible because repressor protein prevents transcription.
  - (d) Feedback inhibition because excess of  $\beta$  galactosidase can switch off transcription.
29. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are : [AIPMT 2015]
- (a) G 34%, A 24.5%, T 24.5%
  - (b) G 17%, A 16.5%, T 32.5%
  - (c) G 17%, A 33%, T 33%
  - (d) G 8.5%, A 50%, T 24.5%
30. Which one of the following is not applicable to RNA? [RE-AIPMT 2015]
- (a) 5' phosphoryl and 3' hydroxyl ends
  - (b) Heterocyclic nitrogenous bases
  - (c) Chargaff's rule
  - (d) Complementary base pairing
31. Identify the correct order of organization of genetic material from largest to smallest: [RE-AIPMT 2015]

- (a) Genome, chromosome, nucleotide, gene  
(b) Genome, chromosome, gene, nucleotide  
(c) Chromosome, genome, nucleotide, gene  
(d) Chromosome, gene, genome, nucleotide
32. Balbiani rings are sites of [RE-AIPMT 2015]  
(a) Nucleotide synthesis (b) Polysaccharide synthesis  
(c) RNA and protein synthesis (d) Lipid synthesis
33. Satellite DNA is important because it: [RE-AIPMT 2015]  
(a) Shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children  
(b) Does not code for proteins and is same in all members of the population  
(c) Codes for enzymes needed for DNA repletion  
(d) Codes for proteins needed in cell cycle.
34. Which of the following is required as inducer(s) for the expression of Lac operon? [NEET - I, 2016]  
(a) Glucose (b) Galactose  
(c) Lactose (d) Lactose and galactose
35. Which of the following is not required for any of the techniques of DNA fingerprinting available at present? [NEET - I, 2016]  
(a) Polymerase chain reaction (b) Zinc figure analysis  
(c) Restriction enzymes (d) DNA – DNA hybridization
36. Which one of the following is the starter codon? [NEET - I, 2016]  
(a) AUG (b) UGA  
(c) UAA (d) UAG
37. The equivalent of a structural gene is [NEET - II, 2016]  
(a) Cistron (b) Operon  
(c) Recon (d) Muton
38. Which of the following rRNAs acts a structural RNA as well as ribozyme in bacteria? [NEET - II, 2016]  
(a) 18 S rRNA (b) 23 S rRNA  
(c) 5.8 S rRNA (d) 5 S rRNA
39. A molecule that can act as a genetic material must fulfil the traits given below, except [NEET - II, 2016]  
(a) It should be able to generate its replica  
(b) It should be unstable structurally and chemically  
(c) It should provide the scope for slow changes that are required for evolution  
(d) It should be able to express itself in the form of Mendelian characters.
40. DNA-dependent RNA polymerase catalyzes transcription on one strand of the DNA which is called the [NEET - II, 2016]  
(a) Coding strand (b) Alpha strand  
(c) Antistrand (d) Template strand

## NCERT EXEMPLAR QUESTIONS

- In a DNA strand the nucleotides are linked together by
  - Glycosidic bonds
  - Phosphodiester bonds
  - Peptide bonds
  - Hydrogen bonds
- A nucleoside differs from a nucleotide. It lacks the
  - Base
  - Sugar
  - Phosphate group
  - Hydroxyl group
- Both deoxyribose and ribose belong to a class of sugars called
  - Trioses
  - Hexoses
  - Pentoses
  - Polysaccharides
- The fact that a purine base always paired through hydrogen bonds with a pyrimidine base leads to \_\_\_\_\_, in the DNA double helix
  - The antiparallel nature
  - The semiconservative nature
  - Uniform width throughout DNA
  - Uniform length in all DNA
- The net electric charge on DNA and histones is
  - Both positive
  - Both negative
  - Negative and positive, respectively
  - Zero
- The promoter site and the terminator site for transcription are located at
  - 3' (downstream) end and 5' (upstream) end, respectively of the transcription unit.
  - 5' (upstream) end and 3' (downstream) end, respectively of the transcription unit.
  - The 5' (upstream) end
  - The 3' (downstream) end
- Which of the following statements is the most appropriate for sickle cell anaemia?
  - It cannot be treated with iron supplements
  - It is a molecular disease
  - It confers resistance to acquiring malaria
  - All of the above
- Which of the following is true with respect to AUG?
  - It codes for methionine only
  - Iris is also an initiation codon
  - It codes for methionine in both prokaryotes and eukaryotes
  - All of the above
- The first genetic material could be
  - Protein
  - Carbohydrates
  - DNA
  - RNA
- With regard to mature mRNA in eukaryotes, which of the following is true?
  - Exons and introns do not appear in the mature RNA.
  - Exons appear but introns do not appear in the mature RNA.
  - Introns appear but exons do not appear in the mature RNA.
  - Both exons and introns appear in the mature RNA.

11. The human chromosome with the highest and least number of genes in them are respectively
  - (a) Chromosome 21 and Y
  - (b) Chromosome 1 and X
  - (c) Chromosome 1 and Y
  - (d) Chromosome X and Y
12. Who amongst the following scientists had no contribution in the development of the double helix model for the structure of DNA?
  - (a) Rosalind Franklin
  - (b) Maurice Wilkins
  - (c) Erwin Chargaff
  - (d) Meselson and Stahl
13. DNA is a polymer of nucleotides which are linked to each other by 3' to 5' phosphodiester bond. To prevent the polymerization of nucleotides, which of the following modifications would you choose?
  - (a) Replace purine with pyrimidines.
  - (b) Remove/replace 3' OH group in deoxyribose.
  - (c) Remove/replace 2' OH group with some other group in deoxyribose.
  - (d) Both 'b' and 'c'.
14. Discontinuous synthesis of DNA occurs in one strand, because
  - (a) DNA molecule being synthesized is very long.
  - (b) DNA dependent DNA polymerase catalyses polymerization only in one direction (5' → 3').
  - (c) It is a more efficient process.
  - (d) DNA ligase has to have a role.
15. Which of the following steps in transcription is catalyzed by RNA polymerase?
  - (a) Initiation
  - (b) Elongation
  - (c) Termination
  - (d) All of the above
16. Control of gene expression takes place at the level of
  - (a) DNA-replication
  - (b) Transcription
  - (c) Translation
  - (d) None of the above
17. Regulatory proteins are the accessory proteins that interact with RNA polymerase and affect its role in transcription. Which of the following statements is correct about regulatory protein?
  - (a) They only increase expression.
  - (b) They only decrease expression.
  - (c) They interact with RNA polymerase but do not affect the expression.
  - (d) They can act both as activators and as repressors.
18. Which was the last human chromosome to be completely sequenced?
  - (a) Chromosome 1
  - (b) Chromosome 11
  - (c) Chromosome 21
  - (d) Chromosome x
19. Which of the following are the functions of RNA?
  - (a) It is a carrier of genetic information from DNA to ribosomes synthesizing polypeptides.
  - (b) It carries amino acids to ribosomes.
  - (c) It is a constituent component of ribosomes.
  - (d) All of the above
20. While analysing the DNA of an organism, a total number of 5386 nucleotides were found out of which the proportion of different bases were:  
Adenine = 29%, Guanine = 17%, Cytosine = 32%, Thymine = 17%, considering the Chargaff's rule it can be concluded that

- (a) It is a double stranded circular DNA  
 (b) It is a single stranded DNA  
 (c) It is a double stranded linear DNA  
 (d) No conclusion can be drawn
21. In some viruses, DNA is synthesized by using RNA as template. Such a DNA is called  
 (a) A - DNA                      (b) B-DNA                      (c) c DNA                      (d) r DNA
22. If Meselson and Stahl's experiment is continued for four generations in bacteria, the ratio of  $^{15}\text{N}/^{15}\text{N} : ^{15}\text{N}/^{14}\text{N} : ^{14}\text{N}/^{14}\text{N}$  containing DNA in the fourth generation would be  
 (a) 1 : 1 : 0                      (b) 1 : 4 : 0                      (c) 0 : 1 : 3                      (d) 0 : 1 : 7
23. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is 5' - A T G A A T G \_ 3', The sequence of bases in its RNA transcript would be  
 (a) 5'-AUGAAUG-3'                      (b) 5'-UACUUAC-3'  
 (c) 5'-CAUUCAU-3'                      (d) 5'-GUAAGUA-3'
24. The RNA polymerase holoenzyme transcribes  
 (a) The promoter, structural gene and the terminator region.  
 (b) The promoter and the terminator region.  
 (c) The structural gene and the terminator regions.  
 (d) The structural gene only.
25. If the base sequence of a codon in mRNA is 5'-AUG-3', the sequence of tRNA pairing with it must be  
 (a) 5' - UAC - 3'                      (b) 5' \_ CAU \_ 3'  
 (c) 5'-AUG-3'                      (d) 5'-GUA-3'
26. The amino acid attaches to the tRNA at its  
 (a) 5'-end                      (b) 3'-end  
 (c) Anticodon site                      (d) DHU loop
27. To initiate translation, the mRNA first binds to  
 (a) The smaller ribosomal sub-unit                      (b) The larger ribosomal sub-unit  
 (c) The whole ribosome                      (d) No such specificity exists
28. In E. coli, the lac operon gets switched on when  
 (a) Lactose is present and it binds to the repressor.  
 (b) Repressor binds to operator.  
 (c) RNA polymerase binds to the operator.  
 (d) Lactose is present and it binds to RNA polymerase.

### Answer Keys

#### Practice Questions

1. (c)    2. (d)    3. (c)    4. (b)    5. (c)    6. (b)    7. (c)    8. (d)    9. (a)    10. (b)  
 11. (c)    12. (c)    13. (c)    14. (c)    15. (d)    16. (c)    17. (c)    18. (b)    19. (b)    20. (d)  
 21. (b)    22. (d)    23. (c)    24. (c)    25. (b)    26. (d)    27. (d)    28. (c)    29. (a)    30. (c)  
 31. (c)    32. (b)    33. (b)    34. (b)    35. (b)    36. (d)    37. (b)    38. (b)    39. (d)    40. (d)  
 41. (b)    42. (d)    43. (d)    44. (b)    45. (b)    46. (c)    47. (a)    48. (a)    49. (e)    50. (b)



51. (d) 52. (b) 53. (c) 54. (c) 55. (b) 56. (c) 57. (a) 58. (c) 59. (b) 60. (b)  
61. (d) 62. (c) 63. (d) 64. (b) 65. (d) 66. (d) 67. (c) 68. (c) 69. (c) 70. (b)  
71. (c) 72. (c) 73. (d) 74. (c) 75. (c) 76. (c) 77. (d) 78. (d) 79. (b) 80. (c)  
81. (d) 82. (a) 83. (c) 84. (a) 85. (c) 86. (c) 87. (d) 88. (c) 89. (c) 90. (b)  
91. (d) 92. (c) 93. (a) 94. (a) 95. (d) 96. (d) 97. (a) 98. (c) 99. (d) 100. (c)  
101. (a) 102. (c) 103. (c) 104. (c) 105. (b) 106. (c) 107. (c) 108. (b) 109. (d) 110. (a)  
111. (c) 112. (c) 113. (c) 114. (c) 115. (c) 116. (b) 117. (b) 118. (d) 119. (c) 120. (c)  
121. (c) 122. (a) 123. (b) 124. (b) 125. (a) 126. (b) 127. (b) 128. (c) 129. (d) 130. (b)  
131. (d) 132. (b) 133. (c) 134. (d) 135. (b) 136. (c) 137. (c) 138. (c) 139. (c) 140. (a)  
141. (b) 142. (c) 143. (b) 144. (c) 145. (d) 146. (b) 147. (d) 148. (d) 149. (c) 150. (b)  
151. (b) 152. (c) 153. (d) 154. (c) 155. (d) 156. (c) 157. (c) 158. (d) 159. (c) 160. (c)  
161. (b) 162. (b) 163. (b) 164. (b) 165. (a) 166. (d) 167. (c) 168. (c) 169. (b) 170. (c)  
171. (b) 172. (c) 173. (b) 174. (a) 175. (d) 176. (c) 177. (d) 178. (b) 179. (b) 180. (c)  
181. (b) 182. (a) 183. (b) 184. (a) 185. (b) 186. (d) 187. (b) 188. (c) 189. (d) 190. (a)  
191. (b) 192. (b) 193. (c) 194. (b) 195. (b)

*Assertion and Reason Questions*

196. (a) 197. (b) 198. (a) 199. (d) 200. (a) 201. (a) 202. (a) 203. (a) 204. (c) 205. (c)  
206. (a) 207. (a) 208. (a) 209. (b) 210. (a) 211. (a) 212. (c) 213. (c) 214. (a)

*Previous Year Questions*

1. (a) 2. (b) 3. (b) 4. (c) 5. (c) 6. (b) 7. (c) 8. (d) 9. (b) 10. (c)  
11. (d) 12. (c) 13. (c) 14. (a) 15. (a) 16. (d) 17. (a) 18. (d) 19. (b) 20. (d)  
21. (c) 22. (a) 23. (a) 24. (c) 25. (d) 26. (a) 27. (b) 28. (b) 29. (c) 30. (c)  
31. (b) 32. (c) 33. (a) 34. (c) 35. (b) 36. (a) 37. (a) 38. (b) 39. (b) 40. (d)

*NCERT Exemplar Questions*

1. (b) 2. (b) 3. (c) 4. (c) 5. (c) 6. (b) 7. (d) 8. (d) 9. (d) 10. (b)  
11. (c) 12. (d) 13. (b) 14. (b) 15. (b) 16. (b) 17. (d) 18. (a) 19. (d) 20. (b)  
21. (c) 22. (d) 23. (a) 24. (d) 25. (b) 26. (b) 27. (a) 28. (a)

## CHAPTER

# 7

# Evolution

### PRACTICE QUESTIONS

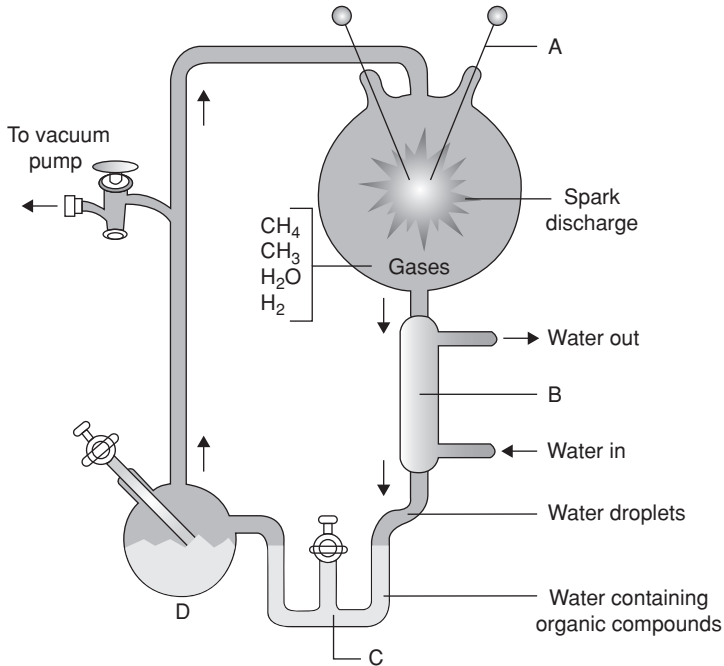
#### Evolution of Life Forms

- Evolutionary biology is related to the
  - Origin of universe
  - Origin of earth
  - Study of history of life forms on earth
  - Origin of stars
- Stellar distances are measured in
  - km
  - m
  - Light year
  - pm
- How old is the universe?
  - 10 billion years
  - 20 billion years
  - 5 billion years
  - 15 billion years
- Galaxies contain
  - Stars
  - Clouds of gas and dust
  - Both
  - None of these
- Select the false statement from the following.
  - Big bang theory is used to explain the origin of the universe.
  - Expansion of the universe after the explosion lead to a decrease in temperature.
  - Hydrogen and helium had formed before the explosion.
  - Gases condensed under gravitation and formed galaxies.
- Earth was formed \_\_\_\_\_ billion years back.
  - 4.5
  - 5.5
  - 3.5
  - 1.5
- Molten mass on early earth produced
  - Water vapour and  $\text{CH}_4$
  - $\text{CO}_2$
  - $\text{NH}_3$
  - All of these
- Which part of solar radiation can break  $\text{H}_2\text{O}$ ?
  - Visible radiation
  - Ultraviolet radiation
  - Infrared
  - None of these
- Life appeared \_\_\_\_\_ years after the formation of earth.
  - 1000 million
  - 100 million
  - 10 million
  - 500 million
- Which of the following is related to the origin of life on earth?
  - Panspermia
  - Theory of spontaneous generation
  - Chemical evolution
  - All of these

11. Who proposed the theory of chemical evolution for the first time?

- (a) Oparin and Haldane (b) Miller  
(c) Louis Pasteur (d) Darwin

12. Identify the parts A, B, C and D in the figure.



- (a) A: Liquid water in trap, B: Electrode, C: Boiling water, D: Condenser  
(b) A: Boiling water, B: Condenser, C: Electrode, D: Liquid water in trap  
(c) A: Electrode, B: Condenser, C: Liquid water in trap, D: Boiling water  
(d) A: Condenser, B: Liquid water in trap, C: Boiling water, D: Electrode

13. Miller simulated early Earth conditions in a laboratory by passing electric discharge through a closed flask raising its temperature to 800°C and containing

- (a)  $\text{CH}_4$  and  $\text{H}_2$  (b)  $\text{NH}_3$   
(c) Water vapour (d) All of these

14. The first non-cellular form of life could have originated \_\_\_\_\_ billion years back.

- (a) 1 (b) 2  
(c) 3 (d) 4

15. Which of the given statement is wrong as per the 'Theory of Special Creation'?

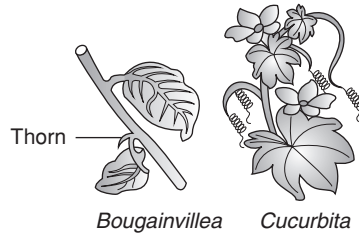
- (a) All living organism created as such (b) Diversity change as time changes  
(c) Earth is about 4000 years old (d) All are correct

16. The fitness referred to in Darwin's theory is

- (a) Physical fitness (b) Mental fitness  
(c) Reproductive fitness (d) All of these

17. Evidence of evolution from fossils is known as  
(a) Paleontological evidence (b) Embryological evidence  
(c) Physiological evidence (d) Biochemical evidence
18. Find out the correct statement from the following.  
(A) According to Darwin, there is a gradual evolution of life forms.  
(B) Darwin travelled around the world in a sail ship named H.M.S. Beagle.  
(C) Alfred Wallace worked in Malay Archipelago.  
(D) Fossils are remains of life forms which have become hard and turned into rock.  
(a) A and B only (b) B only  
(c) C only (d) All are correct
19. Homologous organ represents  
(a) Convergent evolution (b) Divergent evolution  
(c) Anthropogenic evolution (d) Genetic drift
20. Analogous organs represent  
(a) Convergent evolution (b) Divergent evolution  
(c) Anthropogenic evolution (d) Genetic drift
21. Which of the following shows analogy?  
(a) Eye of octopus and mammals  
(b) Vertebrate hearts  
(c) Thorn of Bougainvillea and tendril of Cucurbita  
(d) Vertebrate brains
22. Which of the following shows convergent evolution?  
(a) Mouse and Marsupial mouse (b) Bobcat and Spotted cuscus  
(c) Anteater and Marsupial mole (d) Lemur and Tasmanian wolf
23. Which of the following is an example of anthropogenic evolution?  
(a) Selection of resistant varieties due to herbicides.  
(b) Selection of resistant varieties due to pesticides.  
(c) Industrial melanism  
(d) All the above
24. Dryopithecus and Ramapithecus existed \_\_\_\_\_ mya.  
(a) 5 (b) 10 (c) 15 (d) 25
25. Select the false statements.  
(A) Dryopithecus was more Ape-like.  
(B) Ramapithecus was more Man-like.  
(C) Dryopithecus and Ramapithecus both were hairy and walked like gorillas and chimpanzees.  
(D) Australopithecines lived in the East African grasslands probably 3–4 mya.  
(a) B only (b) B and C only  
(c) D only (d) All are correct
26. Which statement is true about Australopithecines?  
(a) They hunted with stone weapons.  
(b) They ate fruit.  
(c) Two million years ago they lived in the East African grasslands.  
(d) All the above

27. *Homo habilis* had a cranial capacity of nearly  
 (a) 650–800 cc (b) 900 cc  
 (c) 1400 cc (d) 1500 cc
28. Which is true about *Homo erectus*?  
 (a) Brain capacity is 900 cc approx (b) Ate meat  
 (c) Found in Java and exist 1.5 mya (d) All of these
29. What does this diagram show?



- (a) Convergent evolution (b) Divergent evolution  
 (c) Homologous organ (d) Both (b) and (c)
30. All these facts are true about the Neanderthal man except  
 (a) Brain size is 1400 cc.  
 (b) Used hides to protect their bodies.  
 (c) Lived in east and central Asia between 1,00,000–40,000 years back.  
 (d) Their fossils were discovered in Java in 1891.
31. All these facts are true about *Homo sapiens* except  
 (a) Arose 75,000–10,000 years ago (b) Arose in Africa  
 (c) Brain capacity is 1400 cc (d) They developed into distinct races
32. Arrange the following in the order of their evolution.  
 (a) *Homo habilis* → *Ramapithecus* → *Homo erectus* → *Dryopithecus* → *Homo sapiens* → *Australopithecines* → Neanderthal man  
 (b) *Dryopithecus* → *Ramapithecus* → *Australopithecus* → *Homo habilis* → *Homo erectus* → Neanderthal man → *Homo sapiens*  
 (c) *Australopithecines* → *Homo sapiens* → *Ramapithecus* → *Dryopithecus* → *Homo habilis* → *Homo erectus* → Neanderthal man  
 (d) Neanderthal man → *Australopithecines* → *Homo sapiens* → *Homo erectus* → *Homo habilis* → *Ramapithecus* → *Dryopithecus*
33. Match the columns.

| Column-I                | Column-II      |
|-------------------------|----------------|
| (A) <i>Homo habilis</i> | (1) 650–800 cc |
| (B) <i>Homo erectus</i> | (2) 900 cc     |
| (C) Neanderthal man     | (3) 1400 cc    |

- (a) A:1, B:2, C:3 (b) A:2, B:1, C:3  
 (c) A:2, B:3, C:1 (d) A:3, B:2, C:1



43. Which of these is/are aquatic mammals?  
 (a) Whale (b) Dolphin  
 (c) Seals and Sea cows (d) All of these
44. Find the total number of organisms evolved from Psilophyton in the following.  
*Bryophytes, Herbaceous lycopods, Sphenopsids, Ferns, Ginkgos, Conifers, Gnetales, Arborescent lycopods*  
 (a) 2 (b) 3  
 (c) 5 (d) 6
45. All these are animals except  
 (a) Synapsids (b) Therapsids  
 (c) Sphenopsids (d) Sauropsids
46. Seed fern evolved into  
 (a) Cycads (b) Dicot  
 (c) Monocot (d) All of these
47. Which of the following were extinct in the Permian period?  
 (a) Ferns (b) Cycads  
 (c) Arborescent lycopodus (d) Bryophytes
48. Bryophytes evolved in which of these periods?  
 (a) Carboniferous (b) Permian  
 (c) Triassic (d) Cretaceous
49. What does this diagram show?

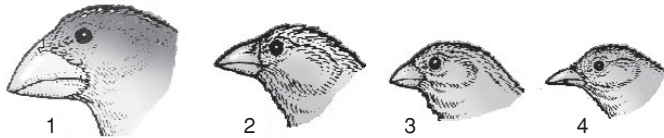


- (a) Brachiosaurus (b) Stegosaurus  
 (c) Triceratops (d) Tyrannosaurus
50. How many of these periods belong to the paleozoic era?  
*Cretaceous, Jurassic, Triassic, Permian, Carboniferous, Devonian, Silurian*  
 (a) 1 (b) 2  
 (c) 3 (d) 4
51. Synapsids existed  
 (a) 300 mya (b) 150 mya  
 (c) 350 mya (d) 50 mya

52. Zosterophyllum belonged to which period?  
 (a) Silurian (b) Devonian  
 (c) Carboniferous (d) Permian
53. Which of the following was/were the most abundant in cenozoic era?  
 (a) Angiosperm (b) Cycads  
 (c) Conifers (d) Ginkgos
54. Which of these features belong/s to mammals?  
 (a) Viviparous, avoid danger (b) More intelligent in sensing  
 (c) Both (a) and (b) (d) None of these
55. What can be said to be the success story of man in evolution?  
 (a) Language skills (b) Self-consciousness  
 (c) Increased cranial capacity (d) All of these
56. Conifers were most abundant in  
 (a) Paleozoic era (b) Mesozoic era  
 (c) Cenozoic era (d) All eras
57. Seed ferns evolved from  
 (a) Cycads (b) Gnetales (c) Conifers (d) Progymnosperm

**Adaptive Radiation**

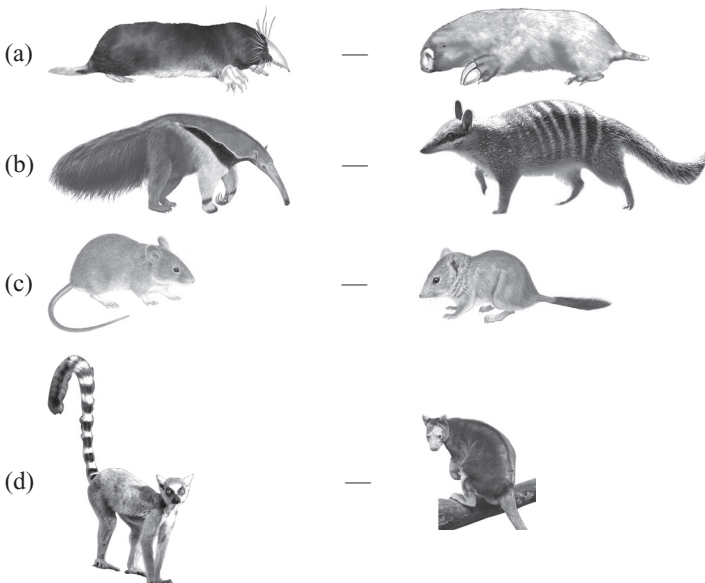
58. This diagram shows:



- (a) Adaptive radiation (b) Genetic drift  
 (c) Founder effect (d) Mutation
59. Arrange the ascending order of extinction (reptiles):  
 (a) Pelycosaurs, Thecodonts, Therapsids, Dinosaurs  
 (b) Thecodonts, Dinosaurs, Pelycosaurs, Therapsids  
 (c) Dinosaurs, Therapsids, Thecodonts, Pelycosaurs  
 (d) Therapsids, Thecodonts, Pelycosaurs, Dinosaurs
60. When a given population is in genetic equilibrium, then  
 (a) Gene pool remains constant.  
 (b) Allele frequencies in population is constant from generation to generation.  
 (c) Sum total of all allelic frequencies is 1.  
 (d) All the above
61. How many factors affect the Hardy–Weinberg equilibrium?  
 (a) 1 (b) 3 (c) 4 (d) 5
62. The factors affecting genetic equilibrium are the following except  
 (a) Gene flow (b) Mutation  
 (c) Somatic variation (d) Genetic recombination

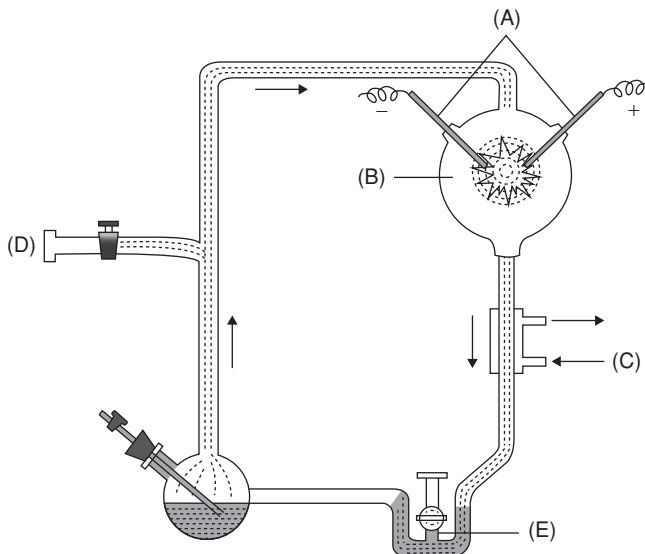


63. The five factors affecting genetic equilibrium are  
 (a) Gene flow, genetic drift (b) Mutation, genetic recombination  
 (c) Natural selection (d) All of these
64. Natural selection is which of the following types?  
 (a) Stabilizing (b) Disruptive  
 (c) Directional (d) Any of these
65. Variation may be due to  
 (a) Mutation  
 (b) Genetic recombinant during gametogenesis  
 (c) Gene flow or genetic drift  
 (d) All the above
66. Hugo de Vries, based on his work on \_\_\_\_\_, brought forth the idea of mutations.  
 (a) *Pisum sativum* (b) *Lathyrus odoratus*  
 (c) Evening primrose (d) *Lathyrus sativus*
67. Mutations are  
 (a) Directionless and random (b) Random and directional  
 (c) Small variations and directional (d) Not responsible for evolution
68. Select the false statement from the following.  
 (a) Darwinian variations are small and directional.  
 (b) Saltation is a single large step mutation.  
 (c) Branching descent and natural selection are the two key concepts of Darwinian theory of evolution.  
 (d) Mutation is random and progressive in nature.
69. Which of the following diagrams is not a correct representation of convergent evolution?



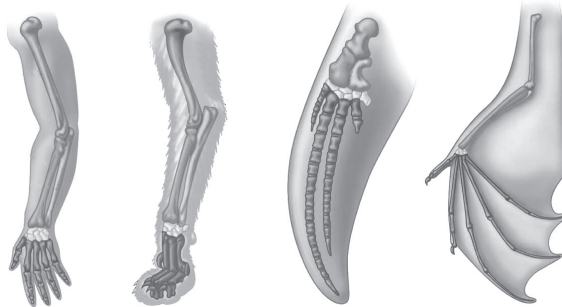
70. Abiogenesis means
- (a) Spontaneous generation
  - (b) Origin of viruses and microbes
  - (c) Origin of life from living organisms
  - (d) Origin of life from nonliving organisms
71. Pasteur's experiments and similar ones that followed convinced most of the people that spontaneous generation of life did not happen because
- (a) Pasteur was extremely meticulous.
  - (b) Pasteur did not boil his flask for a long time.
  - (c) Pasteur used very fine mesh screens to cover his flask.
  - (d) Pasteur's swan-necked flasks ruled out the objection that spoiled air could have contaminated his experiments.
72. The early belief of the spontaneous origin of life was disproved by
- (a) Lederberg
  - (b) Robert Koch
  - (c) Louis Pasteur
  - (d) Charles Darwin
73. Who said that organisms develop from pre-existing organisms?
- (a) Aristotle
  - (b) Louis Pasteur
  - (c) Alexander Oparin
  - (d) Thomas Hunt Morgan
74. The idea that life originates from pre-existing life is referred to as
- (a) Biogenesis theory
  - (b) Abiogenesis theory
  - (c) Extraterrestrial theory
  - (d) Special creation theory
75. Life was created by some supernatural power. This theory is
- (a) Abiogenesis
  - (b) Spore theory
  - (c) Special creation theory
  - (d) Spontaneous generation
76. Life came from outer space, this theory is called
- (a) Spore theory
  - (b) Naturalistic theory
  - (c) Special creation theory
  - (d) Spontaneous generation
77. About how long ago was the Earth formed?
- (a) 3.0 billion years ago
  - (b) 10 billion years ago
  - (c) 4.6 billion years ago
  - (d) 20 billion years ago
78. '*Modern theory of origin of life*' was propounded by
- (a) Oparin
  - (b) Miller
  - (c) Darwin
  - (d) Khorana
79. A. I. Oparin was a
- (a) Polish biologist
  - (b) Russian biochemist
  - (c) Belgian nutritionist
  - (d) Swedish cosmologist
80. Oparin's theory of 'Origin of life' is based on
- (a) Chemical evolution
  - (b) Cosmic evolution
  - (c) Artificial synthesis
  - (d) Organic evolution
81. According to Oparin, which one of the following was not present in the primitive atmosphere of the Earth?
- (a) Oxygen
  - (b) Methane
  - (c) Hydrogen
  - (d) Water vapour

82. The basic components of atmosphere of primitive Earth were  
 (a) Ammonia, methane and water (b) Methane, ozone, nitrogen and water  
 (c) Hydrogen, nitrogen, methane and water (d) Ammonia, methane, hydrogen and water
83. Which of the following is a true statement?  
 (a) The primitive atmosphere had 20 per cent oxygen, just like it is today.  
 (b) The reducing primitive atmosphere contributed to the origin of life and the oxidizing one today would hinder it.  
 (c) The primitive atmosphere was an oxidizing one and today's is a reducing one, making photosynthesis possible.  
 (d) It took so long for prokaryote evolution because the primitive atmosphere screened out the ultraviolet radiation from the sun.
84. Life originated in  
 (a) Air (b) Water (c) Land (d) All of these
85. Stanley Miller proposed the origin of life by  
 (a) Biogenesis (b) Abiogenesis  
 (c) Chemical synthesis (d) None of these
86. The first experiment on chemical evolution and origin of life was carried out by  
 (a) Watson and Crick (b) Miller and Urey  
 (c) Beadle and Tatum (d) Darwin and Wallace
87. The spark-discharge apparatus to test chemical evolution of life was designed by  
 (a) Urey and Miller (b) Dixon and Jolly  
 (c) Jacob and Monod (d) Oparin and Haldane
88. The diagram represents Miller's experiment. Choose the correct combination of labelling:



- (a) A: Electrodes, B:  $\text{NH}_3 + \text{H}_2 + \text{H}_2\text{O} + \text{CH}_4$ , C: Hot water, D: Vacuum, E: U trap  
 (b) A: Electrodes, B:  $\text{NH}_3 + \text{H}_2\text{O}$ , C: Hot water, D: Tap, E: U trap

- (c) A: Electrodes, B:  $\text{NH}_3 + \text{H}_2 + \text{H}_2\text{O}, \text{CH}_4$ , C: Cold water, D: Vacuum, E: U trap  
 (d) A: Electrodes, B:  $\text{NH}_3 + \text{H}_2 + \text{H}_2\text{O} + \text{CH}_4$ , C: Steam, D: Vacuum, E: U Trap  
 (e) A: Electrodes, B:  $\text{NH}_3 + \text{CH}_4$ , C: Cold water, D: Sink, E: U trap
89. The findings of Miller's experiment on origin of life have provided evidence for  
 (a) Theory of biogenesis (b) Oparin-Haldane theory  
 (c) Theory of special creation (d) Theory of organic evolution
90. The category of molecules produced by the Miller-Urey experiment was  
 (a) Organic polymers (b) Inorganic polymers  
 (c) Organic monomers (d) Inorganic monomers
91. Stanley Miller who is famous for 'simulation experiments' belonged to  
 (a) USA (b) UK (c) USSR (d) Canada
92. Stanley Miller conducted his experiments and produced amino acids by electric discharge passed through  $\text{NH}_3, \text{H}_2\text{O}, \text{CH}_4$  and \_\_\_\_\_.  
 (a) Oxygen (b) Hydrogen (c) Nitrogen (d) Carbon dioxide
93. This diagram shows



- (a) Convergent evolution (b) Divergent evolution  
 (c) Homologous organ (d) Both (b) and (c)
94. The energy used in the Miller-Urey experiment was  
 (a) Photo energy (b) Electric spark  
 (c) Atomic radiation (d) Mechanical energy
95. Earliest life forms on the earth were  
 (a) Autotrophs (b) Cyanobacteria  
 (c) Photoautotrophs (d) Chemoheterotrophs
96. The concept of chemical evolution is based on  
 (a) Crystallization of chemicals.  
 (b) Effect of solar radiation on chemicals.  
 (c) Interaction of water, air and clay under intense heat.  
 (d) Possible origin of life by combination of chemicals under suitable environmental conditions.
97. Which one of the following is incorrect about the characteristic of protobionts (coacervates and microspheres) as envisaged in abiogenic origin of life?




- (a) They were able to reproduce.
- (b) They could maintain an internal environment.
- (c) They were partially isolated from the surroundings.
- (d) They could separate the combination of molecule from the surroundings.

### **Biological Evolution**

98. Biologists define evolution as

- (a) Heritable change in a line of descent over generations
- (b) Inheritance of characteristics acquired by the individual
- (c) The origin of species
- (d) None of the above

99. Which of the following diagram does not correctly represent the convergent evolution?

- (a) 
- (b) 
- (c) 
- (d) None of these

100. Basic idea of evolution is

- (a) Cosmic evolution
- (b) Special creation
- (c) Spontaneous generation
- (d) Descent with modification

101. The process of evolution is

- (a) Continuous
- (b) Discontinuous
- (c) Continuous in the past but discontinuous presently
- (d) Discontinuous in the past but continuous presently

102. The concept of evolution is an excellent working hypothesis to approach the problem of

- (a) Matter, energy and life
- (b) Environmental conditions
- (c) Prodigality in reproduction
- (d) Diversity of organisms upon earth

103. Darwin's finches provide excellent evidence in favour of evolution. This evidence comes from the field of

- (a) Anatomy
- (b) Biogeography
- (c) Embryology
- (d) Palaeontology

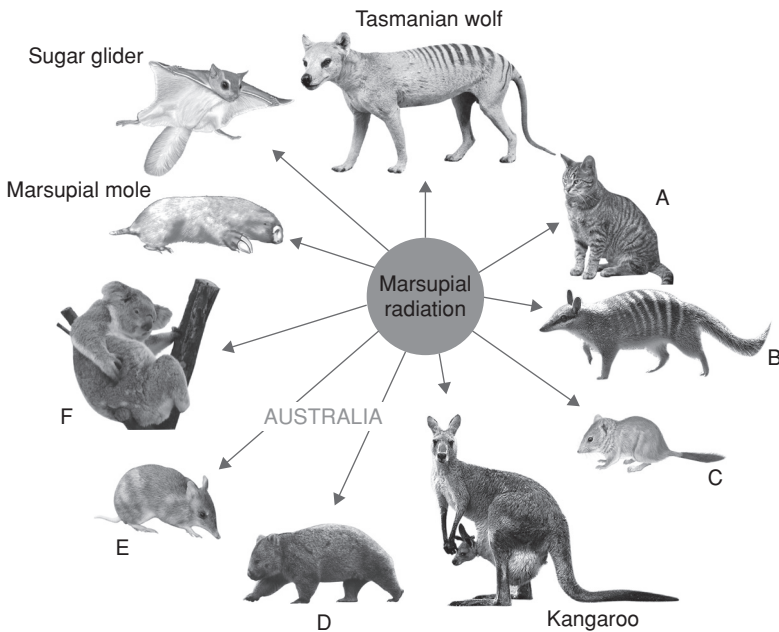
104. The evolution of numerous species, such as Darwin's finches from a single ancestor is called

- (a) Gradualism
- (b) Adaptive radiation
- (c) Sympatric speciation
- (d) Geographical isolation

105. Darwin's finches discovered from the Galapagos Islands serve as a good example of

- (a) Mimicry
- (b) Camouflage
- (c) Seasonal migration
- (d) Biogeographical evidence of evolution

106. The classical example of adaptive radiation in development of new species is  
 (a) Darwin's finches (b) Marsupials of Australia  
 (c) Both (a) and (b) (d) None of these
107. The organs of different species that are related to each other through common descent though becomes functionally different are called  
 (a) Vestigial (b) Analogous (c) Homologous (d) None of these
108. Organs which have the same fundamental structure but different in functions are called  
 (a) Vestigial organs (b) Analogous organs  
 (c) Homoplastic organs (d) Homologous organs
109. Homology does not refer to  
 (a) Divergent evolution (b) Common descent  
 (c) Convergent evolution (d) Adaptive radiation
110. The homologous organs are wings of  
 (a) Pigeon and bat (b) Butterfly and bat  
 (c) Sparrow and honeybee (d) Parrot and limbs of man
111. Which of the following are not homologous?  
 (a) Insect mouthparts (b) Insect legs  
 (c) Vertebrate forelimbs (d) Bird and insect wings
112. Which of the following is a set of homologous organs?  
 (a) Wings of grasshopper, flippers of whale (b) Wings of birds, front feet of horse  
 (c) Wings of housefly, wings of birds (d) None of these
113. Name the organism represented by A to F in the illustration.

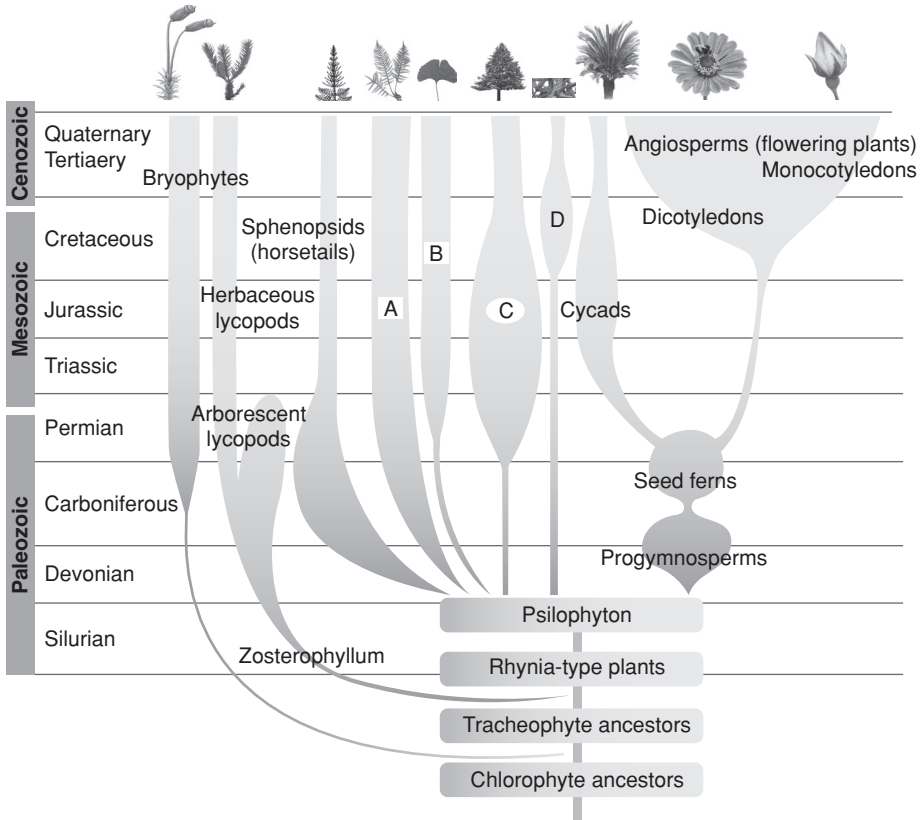


- (a) A: Tigercat, B: Banded anteater, C: Marsupial rat, D: Wombat, E: Bandicoot, F: Koala  
(b) A: Bandicoot, B: Wombat, C: Marsupial rat, D: Koala, E: Tigercat, F: Banded anteater  
(c) A: Koala, B: Banded anteater, C: Tigercat, D: Bandicoot, E: Marsupial rat, E: Wombat  
(d) A: Wombat, B: Tigercat, C: Koala, D: Bandicoot, E: Banded anteater, F: Marsupial rat
- 114.** Which group includes homologous organs?  
(a) Wings of butterfly, flying fish and bird  
(b) Tentacles of hydra and arms of starfish  
(c) Fins of seal, wings of birds and forelimbs of man  
(d) Horns of cattle, tail of horse and teeth of mammals
- 115.** Which of the following are homologous organs?  
(a) Hand of man, wings of bat  
(b) Eyes of man, eyes of squid  
(c) Gills of fish, lungs of man  
(d) Leaf of moss, frond of fern
- 116.** Thorn of bougainvillea and tendril of cucurbita are examples of  
(a) Vestigial organs  
(b) Analogous organs  
(c) Homologous organs  
(d) Retrogressive evolution
- 117.** Although all mammals whale, dolphin, bat, monkey and horse have some important common characters, but they also show conspicuous differences. This is due to the phenomenon of  
(a) Divergence  
(b) Genetic drift  
(c) Convergence  
(d) Normalization
- 118.** Which of the following are homologous organs?  
(a) Wings of insects and bats  
(b) Fins of fishes and flippers of whale  
(c) Fins of fishes and forearms of human  
(d) Forearm of human, bat's wings and whale's flippers
- 119.** Analogous structures are  
(a) Similar in origin and function  
(b) Different in origin and function  
(c) Different in origin but similar in function  
(d) Similar in origin but different in function
- 120.** Analogy is found between  
(a) Wings of birds and bats  
(b) Wings of bat and butterfly  
(c) Hands of man and flippers of whale  
(d) Hands of man and forelimbs of horse
- 121.** Which pair of organs are analogous in nature?  
(a) Gills of fish and gills of prawn  
(b) Ear of frog and ear of rabbit  
(c) Arm of man and limbs of horse  
(d) Wings of bat and flippers of seal
- 122.** Which of the following pairs are correct?  
(a) Bat wing and insect wing are analogous.  
(b) Seal flippers and bat paw are homologous.  
(c) Insect wing and bird wing are homologous.  
(d) Thorn of bougainvillea and tendril of pea are analogous.

123. Which type of evolution is shown by the wings of bats, mosquitoes and pigeons?  
(a) Divergent  
(b) Atavism  
(c) Convergent  
(d) Vestigial organs
124. The most direct evidence of organic evolution is  
(a) Fossils  
(b) Embryos  
(c) Morphology  
(d) Vestigial organs
125. The study of fossils as evidence of evolution is called  
(a) Anatomy  
(b) Embryology  
(c) Palaeontology  
(d) Biogeography
126. The fossils are preserved in  
(a) Sedimentary rocks  
(b) Igneous rocks  
(c) Metamorphic rocks  
(d) None of these
127. Fossil X is older than fossil Y because  
(a) Fossil Y was found in deeper sedimentation.  
(b) Fossil X was found in deeper sedimentation.  
(c) Fossil Y has some vestigial organs functional in X.  
(d) Fossil Y has homologous and analogous organs of X.
128. Our best estimate for the age of Earth, which is 4.5 billion years is supported by  
(a) Gradualism  
(b) Big bang theory  
(c) Assumption of uniformitarianism  
(d) Radioactive dating of the oldest rocks found
129. Correct order is  
(a) Palaeozoic → Mesozoic → Cenozoic  
(b) Mesozoic → Archaeozoic → Proterozoic  
(c) Palaeozoic → Archaeozoic → Cenozoic  
(d) Archaeozoic → Palaeozoic → Proterozoic
130. The largest subdivision in geological time scale is  
(a) Era  
(b) Period  
(c) Epoch  
(d) Century
131. Which of the following is called 'age of fish'?  
(a) Silurian  
(b) Permian  
(c) Devonian  
(d) Cretaceous
132. Carboniferous period of coal deposition was  
(a) 50 million years ago  
(b) 300 million years ago  
(c) 500 million years ago  
(d) 2000 million years ago



133. What is A, B, C and D in the diagram?



- (a) A: Conifers, B: Ginkgos, C: Ferns, D: Gnetales
- (b) A: Ferns, B: Ginkgos, C: Conifers, D: Gnetales
- (c) A: Gnetales, B: Conifers, C: Ginkgos, D: Ferns
- (d) A: Ginkgos, B: Gnetales, C: Ferns, D: Conifers

134. Mesozoic era is the age of

- (a) Birds
- (b) Fishes
- (c) Reptiles
- (d) Mammals

135. Dinosaurs were the

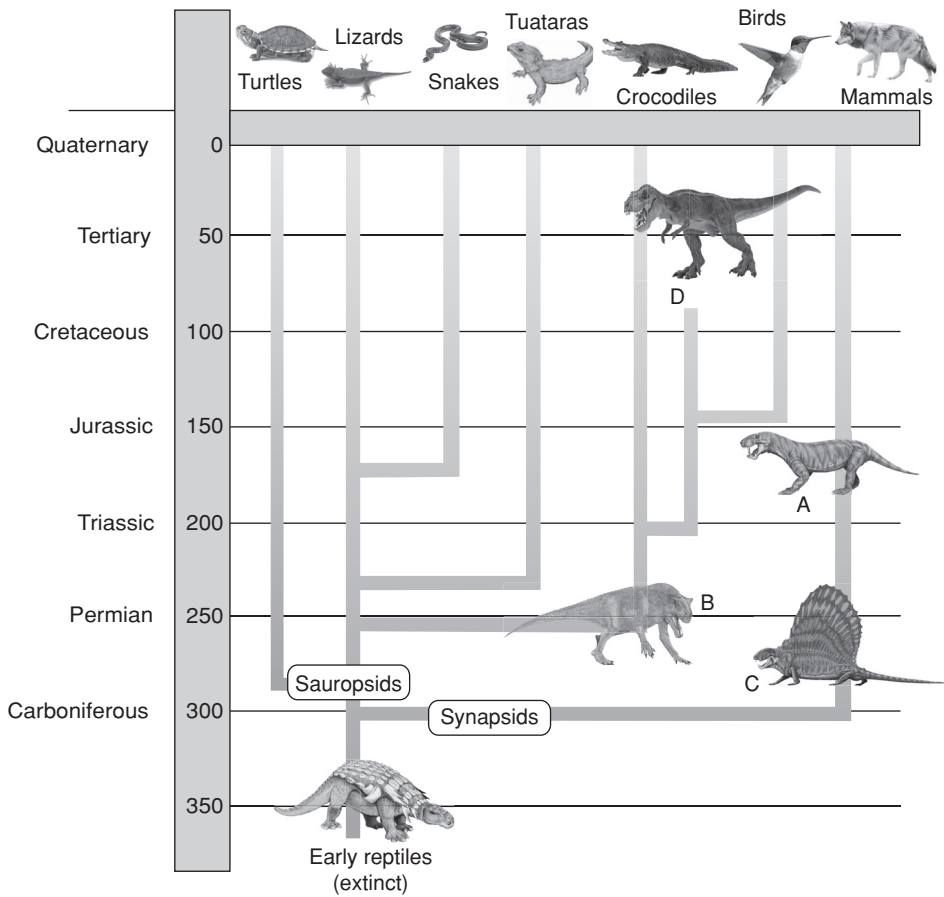
- (a) First mammals
- (b) Extinct reptiles
- (c) Giant mammals
- (d) First amphibians

136. If you want to see a dinosaur, it would be the best to set the controls of your time machine for the

- (a) Mesozoic era
- (b) Precambrian era
- (c) Palaeozoic era
- (d) Pleistocene period

137. Dinosaurs became extinct during  
(a) Jurassic (b) Triassic  
(c) Permian (d) Cretaceous
138. Which era was dominated by reptiles?  
(a) Mesozoic era (b) Cenozoic era  
(c) Palaeozoic era (d) Archaeozoic era
139. The golden age of reptile was  
(a) Mesozoic era (b) Cenozoic era  
(c) Palaeozoic era (d) Proterozoic era
140. The Jurassic period belongs to the era  
(a) Cenozoic (b) Mesozoic  
(c) Palaeozoic (d) Archaeozoic
141. Evolution of unique groups of mammals in South America, Africa and Australia is an evidence supporting  
(a) Continental drift (b) Glaciation  
(c) Crustal movement (d) Geographical juxtaposition
142. Occurrence of endemic species in South America and Australia is due to  
(a) Progressive evolution  
(b) Continental separation  
(c) Absence of terrestrial route to these places  
(d) Extinction of these species in other regions
143. The first attempt to solve the problem of mechanism of organic evolution was made by  
(a) Oparin (b) Darwin  
(c) Wallace (d) Lamarck
144. Lamarck was a  
(a) French naturalist (b) German biologist  
(c) British evolutionist (d) American biochemist
145. Lamarck's theory of evolution is called  
(a) Inheritance of acquired characters  
(b) Theory of special creation  
(c) Survival of the fittest  
(d) None of these
146. The theory of use and disuse of organs was given by  
(a) Lamarck (b) Darwin  
(c) Weissmann (d) Hugo de Vries
147. The most important theory of evolution was proposed by  
(a) Beadle and Tatum (b) Watson and Crick  
(c) Darwin and Wallace (d) Mendel and Morgan
148. The concepts of natural selection in evolution were proposed by  
(a) Hugo de Vries (b) Charles Darwin  
(c) August Weismann (d) Jean Baptiste de Lamarck

149. Darwin travelled in which ship?  
 (a) H.N.S. Eagle (b) Titanic  
 (c) H.M.S. Beagle (d) D. Matrica
150. The main point of Darwin's theory is  
 (a) Variation (b) Mutation  
 (c) Enormous fertility (d) Natural selection
151. Survival of the fittest is possible due to  
 (a) Overproduction (b) Favourable variations  
 (c) Environmental changes (d) Inheritance of acquired characters
152. What is A, B, C and D in this figure?



- (a) A: Therapsids, B: Thecodonts, C: Pelycosaur, D: Dinosaurs  
 (b) A: Thecodonts, B: Dinosaur, C: Therapsid, D: Pelycosaur  
 (c) A: Dinosaurs, B: Pelycosaur, C: Thecodont, D: Therapsid  
 (d) A: Pelycosaur, B: Therapsid, C: Dinosaur, D: Thecodont

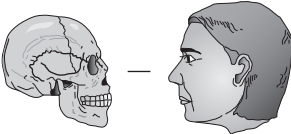


153. The theory of natural selection of Darwin
- (a) Does not explain fossils
  - (b) Is completely changed
  - (c) Has the first theory of organic evolution
  - (d) Has failed in explaining the origin of variations
154. Darwin was influenced by reading the essays of
- (a) Wallace
  - (b) Spencer
  - (c) Mendel
  - (d) Malthus
155. Which one provides the correct sequence of events in origin of species according to Darwinism?
- (A) Natural selection
  - (B) Variations and their inheritance
  - (C) Survival of the fittest
  - (D) Struggle for existence
- (a) A, B, C, D
  - (b) B, D, C, A
  - (c) D, B, C, A
  - (d) B, C, A, D
156. Which of the following is not under Darwin's theory of natural selection?
- (a) Over production
  - (b) Survival of the fittest
  - (c) Causes of variation
  - (d) Struggle for existence
157. Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution?
- (a) Development of transgenic animals.
  - (b) Prevalence of pesticide resistant insects.
  - (c) Production of 'Dolly' the sheep by cloning.
  - (d) Development of organs from 'stem cells' for organ transplantation.
158. The breeding of plants and animals by humans is termed as
- (a) Natural selection
  - (b) Founder effect
  - (c) Neutral variation
  - (d) Artificial selection
159. Improved race of pigeons have been developed by
- (a) Natural selection
  - (b) Artificial selection
  - (c) Protective selection
  - (d) Environmental selection
160. Most modern breeds of domestic dog have been evolved through
- (a) Isolation
  - (b) Sexual selection
  - (c) Artificial selection
  - (d) Natural selection
161. Mutation theory explaining organic evolution was proposed by
- (a) E. Darwin
  - (b) W. Harvey
  - (c) Hugo de Vries
  - (d) Louis Pasteur
162. The material in which Hugo de Vries experimented to explain the mechanism of evolution thus pioneering the theory of mutations was
- (a) Fruitfly
  - (b) China rose
  - (c) Garden pea
  - (d) Evening primrose
163. Hugo de Vries gave his mutation theory on organic evolution while working on
- (a) Althea rosea
  - (b) Pisum sativum
  - (c) Oenothera lamarckiana
  - (d) Drosophila melanogaster

164. For natural selection the important factor is  
 (a) Disuse (b) Variation  
 (c) Catastrophe (d) Special creation
165. In which condition does the gene ratio remain constant for any species?  
 (a) Mutation (b) Gene flow  
 (c) Sexual selection (d) Random mating
166. Initiating the force of evolution is  
 (a) Variation (b) Adaptation  
 (c) Competition (d) Natural selection
167. The raw material for organic evolution is  
 (a) Asexual reproduction (b) Mutation  
 (c) Nutritive substances (d) Effect of hormones
168. Lederberg replica experiment explains  
 (a) Mutation theory (b) Darwin's theory  
 (c) Lamarck's theory (d) None of these
169. Some bacteria are able to grow in streptomycin containing medium due to  
 (a) Genetic drift (b) Natural selection  
 (c) Induced mutation (d) Reproductive isolation
170. Sum of all the genes in a population is called  
 (a) Genome (b) Gene pool  
 (c) Germplasm (d) Gene bank
171. At a particular locus, frequency of 'A' allele is 0.6 and that of 'a' is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium?  
 (a) 0.36 (b) 0.48  
 (c) 0.16 (d) 0.24
172. Genetic drift operates in  
 (a) Large isolated population (b) Small isolated population  
 (c) Fast reproductive population (d) Slow reproductive population
173. Match the following concepts of evolution in List-I with List-II and select the correct answer using the codes given below the lists:

| List-I                | List-II                                                                 |
|-----------------------|-------------------------------------------------------------------------|
| (A) Mutation          | (1) Changes in population's allele frequencies due to chance alone.     |
| (B) Gene flow         | (2) Differences in survival and reproduction among variant individuals. |
| (C) Natural selection | (3) Immigration, emigration change allele frequencies.                  |
| (D) Genetic drift     | (4) Source of new alleles                                               |

- (a) A:1, B:2, C:3, D:4  
 (c) A:3, B:1, C:4, D:2

- (b) A:4, B:2, C:3, D:1  
 (d) A:4, B:3, C:2, D:1

174. Which of the following concepts is known as the Sewall Wright effect?  
 (a) Genetic drift (b) Isolation  
 (c) Gene pool (d) Gene flow
175. Which of the following would stop evolution by barring the occurrence of the natural selection?  
 (a) If humans became extinct because of a disease or epidemic.  
 (b) If ozone depletion led to increased ultraviolet radiation which caused many new mutations.  
 (c) If a thermonuclear war killed most of the living organisms and changed the environment drastically.  
 (d) If genetic recombination, sexual reproduction and mutation stopped so that all offspring of all organisms were exact copies of their parents.
176. Directional selection \_\_\_\_\_.  
 (a) Works against adaptive traits  
 (b) Favours intermediate forms of a trait  
 (c) Eliminates uncommon forms of alleles  
 (d) Shifts allele frequencies in a steady, consistent direction
177. Disruptive selection \_\_\_\_\_.  
 (a) Eliminates uncommon forms of alleles  
 (b) Does not favour intermediate forms of a trait  
 (c) Shifts allele frequencies in a steady, consistent direction  
 (d) All the above
178. Which of these is a correct match?  
 (a)   
 (b)   
 (c)   
 (d) All the above
179. The processes of \_\_\_\_\_ and \_\_\_\_\_ generate variation and \_\_\_\_\_ produces adaptation to the environment.  
 (a) Sexual selection, natural selection, mutation  
 (b) Mutation, sexual recombination, genetic drift  
 (c) Genetic drift, mutation, sexual recombination  
 (d) Mutation, sexual recombination, natural selection
180. Industrial melanism was highlighted by  
 (a) Polar bear (b) Rock python  
 (c) *Mimosa pudica* (d) *Biston betularia*

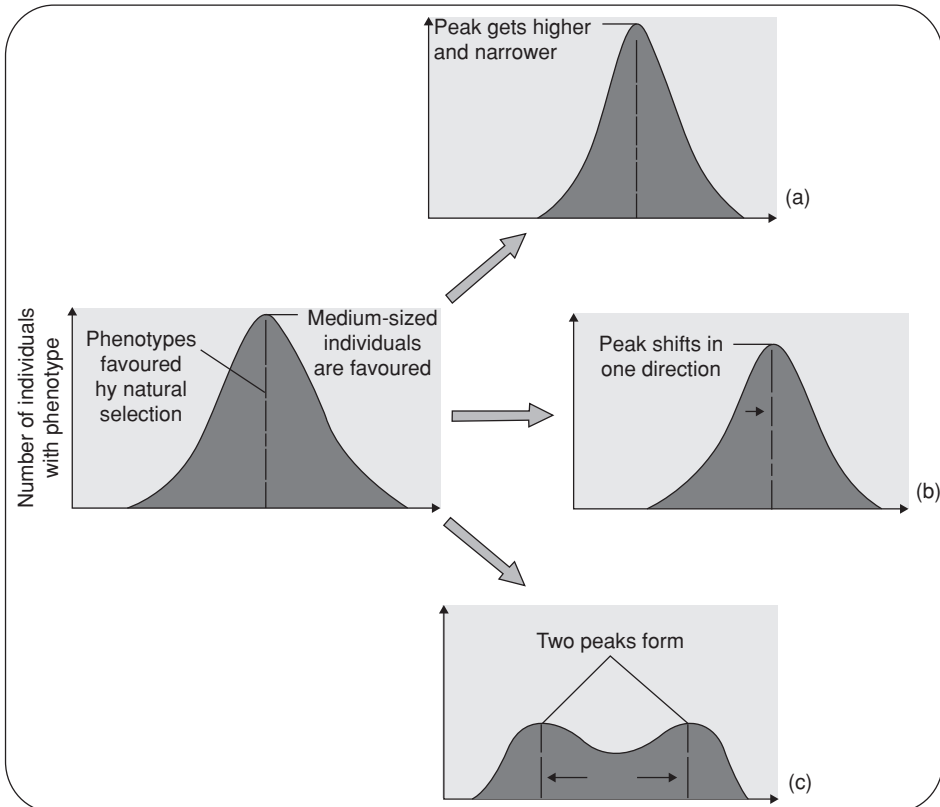
181. The phenomenon of 'Industrial melanism' demonstrates  
(a) Natural selection (b) Induced mutation  
(c) Reproductive isolation (d) Geographical isolation
182. The change of the lighter coloured variety of peppered moth, *Biston betularia*, to its darker variety (*carbonaria*) is due to  
(a) Deletion of a segment of genes due to industrial pollution.  
(b) Mutation of single Mendelian gene for survival in smoke laden industrial environment.  
(c) Industrial carbon deposited on the wings of the moth resulting in darker variety.  
(d) Translocation of a block of genes in chromosomes in response to heavy carbons.
183. Speciation usually occurs  
(a) Suddenly  
(b) By genetic drift  
(c) When populations are geographically isolated  
(d) When populations are not geographically isolated
184. Which is the basis for evolution?  
(a) Cell (b) Species  
(c) Individual (d) Population
185. The classical example of adaptive radiation in the development of new species is  
(a) Darwin finches (b) Marsupials of Australia  
(c) Giant turtles (d) All of these
186. The spread of genes from one breeding population to another by migration which may result in change in gene frequency is  
(a) Gene flow (b) Genetic drift  
(c) Gene frequency (d) None of these
187. Arrange the periods of Palaeozoic era in ascending order in a geological time scale:  
(a) Cambrian → Ordovician → Silurian → Devonian → Carboniferous → Permian  
(b) Cambrian → Devonian → Ordovician → Silurian → Carboniferous → Permian  
(c) Cambrian → Ordovician → Devonian → Silurian → Carboniferous → Permian  
(d) Silurian → Devonian → Cambrian → Ordovician → Permian → Carboniferous
188. The presence of recessive trait is 16 per cent. The frequency of dominant allele in population is  
(a) 0.6 (b) 0.32 (c) 0.84 (d) 0.92
189. The frequency of an autosomal lethal gene is 0.4. The frequency of carrier in a population of 200 individual is  
(a) 72 (b) 96 (c) 104 (d) 36
190. Darwin's finches are found in  
(a) Tahiti (b) Tundra  
(c) Galapagos Island (d) None of these
191. In the developmental history of mammalian heart, it is observed that it passes through a two chambered fishlike heart, three chambered frog-like heart and finally four chambered stage. To which hypothesis can this above cited statement be approximated?  
(a) Biogenetic law (b) Lamarck's principle  
(c) Hardy-Weinberg law (d) Mendelian principles

192. Darwin's finches are an excellent example of
- (a) Connecting links
  - (b) Brood parasitism
  - (c) Adaptive radiation
  - (d) Seasonal migration

193. Sweet potato and potato are examples of
- (a) Homologous structures
  - (b) Analogous structures
  - (c) Both (a) and (b)
  - (d) None of these

**Hardy-Weinberg Principle**

194. The principle that gives the geneticists a tool to determine when evolution is occurring is
- (a) Hardy-Weinberg principle
  - (b) Chemiosmotic theory
  - (c) Malthusian principle
  - (d) Cloning theory
195. Which of the following defines Hardy-Weinberg's law?
- (a)  $p^2 + 2pq + q^2 = 0$
  - (b)  $q^2 + p^2 + 2pq = 0$
  - (c)  $p^2 + 2pq + q^2 = 1$
  - (d)  $p^2 + 3pq + q^2 = 1$
196. Hardy-Weinberg equilibrium is known to be affected by gene flow, genetic drift, mutation, genetic recombination and \_\_\_\_\_.
- (a) Saltation
  - (b) Evolution
  - (c) Limiting factors
  - (d) Natural selection
197. In this figure, which kind of selection does A, B and C represent respectively?





- (a) A: Stabilizing, B: Disruptive, C: Directional
- (b) A: Stabilizing, B: Directional, C: Disruptive
- (c) A: Disruptive, B: Stabilizing, C: Directional
- (d) A: Directional, B: Disruptive, C: Stabilizing

### ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

- 198. Assertion:** The Big Bang theory attempts to explain to us the origin of universe.  
**Reason:** It talks of a singular huge explosion unimaginable in physical terms.
- 199. Assertion:** Natural selection is the mechanism of evolution.  
**Reason:** Those who better fit in an environment, leave more progeny than other, therefore will survive more and hence selected by nature.
- 200. Assertion:** Homologous organ represent divergent evolution.  
**Reason:** Homology indicate common ancestry.
- 201. Assertion:** Single step large mutation is called saltation.  
**Reason:** Mutation is responsible for speciation.
- 202. Assertion:** Homo erectus probably ate meat.  
**Reason:** Homo erectus had a large brain around 900 cc.
- 203. Assertion:** Pouched mammals of Australia survived by continental drift.  
**Reason:** It is because of lack of competition from any other mammals.
- 204. Assertion:** Agriculture came around 18,000 years ago.  
**Reason:** Pre-historic cave art developed about 10,000 years ago.
- 205. Assertion:** Dryopithecus was more man-like.  
**Reason:** Ramapithecus was more ape-like.
- 206. Assertion:** Comparative biochemistry provides strong evidence in favour of common ancestry of living beings.  
**Reason:** Genetic code in universal.
- 207. Assertion:** Human losses gene for tail.  
**Reason:** Lamarck's theory of evolution is known as the theory of continuity of germplasm.
- 208. Assertion:** There was no atmosphere on early earth.  
**Reason:** Temperature of earth at that time is very high.
- 209. Assertion:** Pasteur demonstrates that life comes from pre existing life.  
**Reason:** Pasteur performed swan neck experiment.

210. **Assertion:** Formation of life was preceded by chemical evolution.  
**Reason:** Inorganic molecules are formed from disintegration of organic constituents initially.
211. **Assertion:** Chemical evolution was more or less accepted.  
**Reason:** Miller in his experiment observed the formation of amino acids in similar condition which was their on earth at the time of origin.
212. **Assertion:** All organisms we see today were created as such.  
**Reason:** Diversity was always same on earth since creation
213. **Assertion:** New life forms have arisen at different times in the history of earth.  
**Reason:** Fossils study showed that life forms varied over time.
214. **Assertion:** Homology is based on divergent evolution.  
**Reason:** Analogy is result of convergent evolution.
215. **Assertion:** Sweet potato and potato is an example for analogy.  
**Reason:** They have different origin but perform same function that is storage of food.
216. **Assertion:** Herbicide resistant varieties can be selected in lesser time scale.  
**Reason:** It can be possible by anthropogenic action that is excessive use of herbicides.

---

**PREVIOUS YEAR QUESTIONS**

---

1. The most apparent change during the evolutionary history of Homo sapiens is traced in [AIPMT MAINS 2010]
- (a) Loss of body hair (b) Walking upright  
(c) Shortening of the jaws (d) Remarkable increase in the brain size
2. Given below are four statements (A to D) each with one or two blanks. Select the option which correctly fills up the blanks in two statements.
- Statements:
- (A) Wings of butterfly and birds look alike and are the results of \_\_\_\_ evolution.  
(B) Miller showed that  $\text{CH}_4$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and \_\_\_\_ when exposed to electric discharge in a flask resulted in formation of \_\_\_\_.  
(C) Vermiform appendix is a \_\_\_\_ organ and are \_\_\_\_ evidence of evolution.  
(D) According to Darwin, evolution took place due to \_\_\_\_ and \_\_\_\_ of the fittest. [AIPMT MAINS 2010]
- (a) (D) – (i) small variations, (ii) survival, (A) – (i) convergent  
(b) (A) – (i) convergent, (B) – (i) oxygen, (ii) nucleosides  
(c) (B) – (i) water vapour, (ii) amino acids (C) – rudimentary, (ii) anatomical  
(d) (C) – (i) vestigial, (ii) anatomical (D) – (i) mutations, (ii) multiplication
3. Darwin's finches are a good example of [AIPMT PRE 2010]
- (a) Industrial melanism (b) Connecting link  
(c) Adaptive radiation (d) Convergent evolution
4. What was the most significant trend in the evolution of modern man (Homo sapiens) from his ancestors? [AIPMT PRE 2011]

- (a) Shortening of jaws  
(c) Increasing brain capacity
- (b) Binocular vision  
(d) Upright posture

5. Mutations can be induced with

[AIPMT PRE 2011]

- (a) IAA  
(c) Gamma radiations
- (b) Ethylene  
(d) Infra red radiations

6. Sweet potato is homologous to

[AIPMT MAINS 2011]

- (a) Potato  
(c) Ginger
- (b) *Colocasia*  
(d) Turnip

7. The idea of mutations was brought forth by

[AIPMT MAINS 2012]

- (a) Gregor Mendel, who worked on *Pisum sativum*.  
(b) Hardy Weinberg, who worked on allele frequencies in a population.  
(c) Charles Darwin, who observed a wide variety of organisms during sea voyage.  
(d) Hugo de Vries, who worked on evening primrose.

8. Which one of the following sets of items in the option 1 to 4 are correctly categorized with one exception in it?

[AIPMT MAINS 2012]

| Items                                | Category              | Exception  |
|--------------------------------------|-----------------------|------------|
| (a) Kangaroo, Koala, Wombat          | Australian marsupials | Wombat     |
| (b) Plasmodium, Cuscuta, Trypanosoma | Protozoan parasites   | Cuscuta    |
| (c) Typhoid, Pneumonia, Diphtheria   | Bacterial diseases    | Diphtheria |
| (d) UAA, UAG, UGA                    | Stop codons           | UAG        |

9. Which one of the following is a wrong statement regarding mutations?

[AIPMT MAINS 2012]

- (a) Cancer cells commonly show chromosomal aberrations.  
(b) UV and Gamma rays are mutagens.  
(c) Change in a single base pair of DNA does not cause mutation.  
(d) Deletion and insertion of base pairs cause frame-shift mutations.

10. Evolution of different species in a given area starting from a point and spreading to other geographical areas is known as

[AIPMT PRE 2012]

- (a) Adaptive radiation  
(c) Migration
- (b) Natural selection  
(d) Divergent evolution

11. Which one of the following options gives one correct example each of convergent evolution and divergent evolution?

[AIPMT PRE 2012]

| Convergent evolution                                                | Divergent evolution               |
|---------------------------------------------------------------------|-----------------------------------|
| (a) Eyes of octopus and mammals                                     | Bones of forelimbs of vertebrates |
| (b) Thorns of <i>Bougainvillea cucurbita</i>                        | Wings of butterflies and birds    |
| (c) Bones of forelimbs of vertebrates                               | Wings of butterflies and birds    |
| (d) Thorns of <i>Bougainvillea</i> and tendrils of <i>Cucurbita</i> | Eyes of octopus and mammals       |

12. What was the most significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors?  
[AIPMT PRE 2012]
- (a) Shortening of jaws (b) Binocular vision  
(c) Increasing cranial capacity (d) Upright posture
13. The extinct human who lived 1,00,000 to 40,000 years ago, in Europe, Asia and parts of Africa, with short stature, heavy eye brows, retreating fore heads, large jaws with heavy teeth, stocky bodies, a lumbering gait and stooped posture was  
[AIPMT PRE 2012]
- (a) *Homo habilis* (b) Neanderthal human  
(c) *Cro-magnon* human (d) *Ramapithecus*
14. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge is called  
[AIPMT 2013]
- (a) Natural selection (b) Convergent evolution  
(c) Non-random evolution (d) Adaptive radiation
15. The tendency of population to remain in genetic equilibrium may be disturbed by  
[AIPMT 2013]
- (a) Random mating (b) Lack of migration  
(c) Lack of mutations (d) Lack of random mating
16. The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function. This is an example of  
[AIPMT 2013]
- (a) Homologous organs that have evolved due to convergent evolution.  
(b) Homologous organs that have evolved due to divergent evolution.  
(c) Analogous organs that have evolved due to convergent evolution.  
(d) Analogous organs that have evolved due to divergent evolution.
17. According to Darwin, the organic evolution is due to  
[AIPMT 2013]
- (a) Intraspecific competition  
(b) Interspecific competition  
(c) Competition within closely related species.  
(d) Reduced feeding efficiency in one species due to the presence of interfering species.
18. Forelimbs of cat, lizard is used in walking; forelimbs of whale is used in swimming and forelimb of bats is used in flying are an example of  
[AIPMT 2014]
- (a) Analogous organs (b) Adaptive radiation  
(c) Homologous organs (d) Convergent evolution
19. Which one of the following are analogous structures?  
[AIPMT 2014]
- (a) Wings of Bat and Wings of Pigeon  
(b) Gills of Prawn and Lungs of Man  
(c) Thorns of *Bougainvillea* and Tendrils of *Cucurbita*  
(d) Flippers of Dolphin and Legs of Horse

20. Which is the most common mechanism of genetic variation in the population of the sexually reproducing organism? [AIPMT 2015]
- (a) Transduction  
(b) Chromosomal aberrations  
(c) Genetic drift  
(d) Recombination
21. Which of the following had the smallest brain capacity? [AIPMT 2015]
- (a) Homo erectus  
(b) Homo sapiens  
(c) Homo neanderthalensis  
(d) Homo habilis
22. A population will not exist in Hardy-Weinberg equilibrium if: [AIPMT 2015]
- (a) Individuals mate selectively  
(b) There are no mutations  
(c) There is no migration  
(d) The population is large
23. Industrial melanism is an example of: [RE-AIPMT 2015]
- (a) Natural selection  
(b) Mutation  
(c) Leo Lamarckism  
(d) Neo Darwinism
24. The wings of a bird and the wings of an insect are: [RE-AIPMT 2015]
- (a) Analogous structures and represent convergent evolution  
(b) Phylogenetic structures and represent divergent evolution  
(c) Homologous structures and represent convergent evolution  
(d) Homologous structures and represent divergent evolution
25. Which of the following structures is homologues to the wing of a birds? [NEET - I, 2016]
- (a) Dorsal fin of a Shark  
(b) Wing of a Moth  
(c) Hind limb of Rabbit  
(d) Flipper of Whale
26. Following are the two statements regarding the origin of life: [NEET - I, 2016]
- (A) The earliest organisms that appeared on the earth were non-green and presumably anaerobes.  
(B) The first autotrophic organisms were the chemoautotroph that never released oxygen.
- Of the above statements which one of the following options is correct?
- (a) (A) is correct but (B) is false  
(b) (B) is correct but (A) is false  
(c) Both (A) and (B) are correct  
(d) Both (A) and (B) are false
27. Analogous structures are a result of: [NEET - I, 2016]
- (a) Divergent evolution  
(b) Convergent evolution  
(c) Shared ancestry  
(d) Stabilizing selection
28. Genetic drift operates is [NEET - II, 2016]
- (a) Large isolated population  
(b) Non-reproductive population  
(c) Slow reproductive population  
(d) Small isolated population
29. In Hardy-Weinberg equation, the frequency of heterozygous individual is represented by [NEET - II, 2016]
- (a)  $2pq$   
(b)  $pq$   
(c)  $q^2$   
(d)  $p^2$

30. The chronological order of human evolution from early to the recent is [NEET - II, 2016]
- (a) Ramapithecus → Australopithecus → Homo habilis → Homo erectus
  - (b) Ramapithecus → Homo habilis → Australopithecus → Homo erectus
  - (c) Australopithecus → Homo habilis → Ramapithecus → Homo erectus
  - (d) Australopithecus → Ramapithecus → Homo habilis → Homo erectus
31. Which of the following is the correct sequence of events in the origin of life? [NEET - II, 2016]
- I. Formation of protobionts
  - II. Synthesis of organic monomers
  - III. Synthesis of organic polymers
  - IV. Formation of DNA-based genetic systems
- (a) I, III, II, IV
  - (b) II, III, I, IV
  - (c) II, III, IV, I
  - (d) I, II, III, IV

---

**NCERT EXEMPLAR QUESTIONS**

---

1. Which of the following is used as an atmospheric pollution indicator?  
(a) Lepidoptera      (b) Lichens      (c) Lycopersicon      (d) Lycopodium
2. The theory of spontaneous generation stated that  
(a) Life arose from living forms only.  
(b) Life can arise from both living and non-living.  
(c) Life can arise from non-living things only.  
(d) Life arises spontaneously, neither from living nor from the non-living.
3. Animal husbandry and plant breeding programmes are the examples of  
(a) Reverse evolution      (b) Artificial selection  
(c) Mutation      (d) Natural selection
4. Paleontological evidences for evolution refers to the  
(a) Development of embryo      (b) Homologous organs  
(c) Fossils      (d) Analogous organs
5. The bones of forelimbs of whale, bat, cheetah and man are similar in structure, because  
(a) One organism has given rise to another      (b) They share a common ancestor  
(c) They perform the same function      (d) They have biochemical similarities
6. Analogous organs arise due to  
(a) Divergent evolution      (b) Artificial selection  
(c) Genetic drift      (d) Convergent evolution
7.  $(p + q)^2 = p^2 + 2pq + q^2 = 1$  represents an equation used in  
(a) Population genetics      (b) Mendelian genetics  
(c) Biometrics      (d) Molecular genetics
8. Appearance of antibiotic-resistant bacteria is an example of  
(a) Adaptive radiation      (b) Transduction  
(c) Pre-existing variation in the population      (d) Divergent evolution

9. Evolution of life shows that life forms had a trend of moving from  
 (a) Land to water (b) Dry land to wet land  
 (c) Fresh water to sea water (d) Water to land
10. Viviparity is considered to be more evolved because  
 (a) The young ones are left on their own.  
 (b) The young ones are protected by a thick shell.  
 (c) The young ones are protected inside the mother's body and are looked after they are born leading to more chances of survival.  
 (d) The embryo takes a long time to develop.
11. Fossils are generally found in  
 (a) Sedimentary rocks (b) Igneous rocks  
 (c) Metamorphic rocks (d) Any type of rock
12. For the MN-blood group system, the frequencies of M and N alleles are 0.7 and 0.3, respectively. The expected frequency of MN-blood group bearing organisms is likely to be  
 (a) 42 per cent (b) 49 per cent  
 (c) 9 per cent (d) 58 per cent
13. The most accepted line of descent in human evolution is  
 (a) Australopithecus → Ramapithecus → Homo sapiens → Homo habilis  
 (b) Homo erectus → Homo habilis → Homo sapiens  
 (c) Ramapithecus → Homo habilis → Homo erectus → Homo sapiens  
 (d) Australopithecus → Ramapithecus → Homo erectus → Homo habilis → Homo sapiens
14. Which of the following is an example for link species?  
 (a) Lobe fish (b) Dodo bird  
 (c) Sea weed (d) Chimpanzee
15. Which type of selection is industrial melanism observed in moth, *Biston bitularia*?  
 (a) Stabilizing (b) Directional  
 (c) Disruptive (d) Artificial
16. Match the scientists listed under column 'A' with 'ideas listed in column 'B'.

| Column A     | Column B                          |
|--------------|-----------------------------------|
| i. Darwin    | M. Abiogenesis                    |
| ii. Oparin   | N. Use and disuse of organs       |
| iii. Lamarck | O. Continental drift theory       |
| iv. Wagner   | P. Evolution by natural selection |

- (a) i - M; ii - P; iii - N; iv - O  
 (b) i - P ; ii - M; iii - N; iv - O  
 (c) i - N; ii - P; iii - O; iv - M  
 (d) i - P; ii - O; iii - N; iv - M
17. In 1953, S. L. Miller created the primitive earth conditions in the laboratory and gave experimental evidence for the origin of first form of life from pre-existing non-living organic molecules. The primitive earth conditions created include  
 (a) Low temperature, volcanic storms, atmosphere rich in oxygen.  
 (b) Low temperature, volcanic storms, reducing atmosphere.

- (c) High temperature, volcanic storms, non-reducing atmosphere.  
 (d) High temperature, volcanic storms, reducing atmosphere containing  $\text{CH}_4$ ,  $\text{NH}_3$ , etc.

18. Variations during mutations of meiotic recombination are

- (a) Random and directionless (b) Random and directional  
 (c) Random and small (d) Random, small and directional

### Answer Keys

#### Practice Questions

1. (c) 2. (c) 3. (b) 4. (c) 5. (c) 6. (a) 7. (d) 8. (b) 9. (d) 10. (d)  
 11. (a) 12. (c) 13. (d) 14. (c) 15. (b) 16. (c) 17. (a) 18. (d) 19. (b) 20. (a)  
 21. (a) 22. (a) 23. (d) 24. (c) 25. (c) 26. (d) 27. (a) 28. (d) 29. (d) 30. (d)  
 31. (c) 32. (b) 33. (a) 34. (c) 35. (d) 36. (b) 37. (b) 38. (b) 39. (a) 40. (c)  
 41. (a) 42. (d) 43. (d) 44. (c) 45. (c) 46. (d) 47. (c) 48. (a) 49. (a) 50. (d)  
 51. (a) 52. (a) 53. (a) 54. (c) 55. (d) 56. (b) 57. (d) 58. (a) 59. (a) 60. (d)  
 61. (d) 62. (c) 63. (d) 64. (d) 65. (d) 66. (c) 67. (a) 68. (d) 69. (c) 70. (a)  
 71. (d) 72. (c) 73. (b) 74. (a) 75. (c) 76. (a) 77. (c) 78. (a) 79. (b) 80. (a)  
 81. (a) 82. (d) 83. (b) 84. (b) 85. (c) 86. (b) 87. (a) 88. (c) 89. (b) 90. (c)  
 91. (a) 92. (b) 93. (d) 94. (b) 95. (d) 96. (d) 97. (a) 98. (a) 99. (d) 100. (d)  
 101. (a) 102. (d) 103. (b) 104. (b) 105. (d) 106. (c) 107. (c) 108. (d) 109. (c) 110. (d)  
 111. (d) 112. (b) 113. (a) 114. (c) 115. (a) 116. (c) 117. (a) 118. (d) 119. (c) 120. (b)  
 121. (a) 122. (a) 123. (c) 124. (a) 125. (c) 126. (a) 127. (b) 128. (d) 129. (a) 130. (a)  
 131. (c) 132. (b) 133. (b) 134. (c) 135. (b) 136. (a) 137. (d) 138. (a) 139. (a) 140. (b)  
 141. (a) 142. (b) 143. (d) 144. (a) 145. (a) 146. (a) 147. (c) 148. (b) 149. (c) 150. (d)  
 151. (b) 152. (a) 153. (d) 154. (d) 155. (c) 156. (c) 157. (b) 158. (d) 159. (b) 160. (c)  
 161. (c) 162. (d) 163. (c) 164. (b) 165. (d) 166. (a) 167. (b) 168. (b) 169. (b) 170. (b)  
 171. (b) 172. (b) 173. (d) 174. (a) 175. (d) 176. (d) 177. (b) 178. (d) 179. (d) 180. (d)  
 181. (a) 182. (b) 183. (c) 184. (b) 185. (a) 186. (a) 187. (a) 188. (a) 189. (b) 190. (c)  
 191. (a) 192. (c) 193. (b) 194. (a) 195. (c) 196. (d) 197. (b)

#### Assertion and Reason Questions

198. (b) 199. (a) 200. (a) 201. (b) 202. (b) 203. (a) 204. (d) 205. (d) 206. (b) 207. (d)  
 208. (b) 209. (a) 210. (c) 211. (a) 212. (d) 213. (a) 214. (b) 215. (a) 216. (a)

#### Previous Year Questions

1. (d) 2. (a) 3. (c) 4. (c) 5. (c) 6. (d) 7. (d) 8. (b) 9. (c) 10. (a)  
 11. (a) 12. (c) 13. (b) 14. (b) 15. (d) 16. (c) 17. (b) 18. (c) 19. (b) 20. (d)  
 21. (d) 22. (a) 23. (a) 24. (a) 25. (d) 26. (c) 27. (b) 28. (d) 29. (a) 30. (a)  
 31. (b)

#### NCERT Exemplar Questions

1. (b) 2. (c) 3. (b) 4. (c) 5. (b) 6. (d) 7. (a) 8. (c) 9. (d) 10. (c)  
 11. (a) 12. (a) 13. (c) 14. (d) 15. (b) 16. (b) 17. (d) 18. (a)



*This page is intentionally left blank.*

Unit



# Biology in Human Welfare

**Chapter 8:** Human Health and Disease

**Chapter 9:** Strategies for Enhancement in  
Food Production

**Chapter 10:** Microbes in Human Welfare

## Students Note

This unit is divided into three chapters—Human Health and Disease, Strategies for Enhancement in Food Production and Microbes in Human Welfare. Out of all the chapters, Chapter 8 (Human health and Disease) is very important. Also, in Chapters 9 and 10, the given examples are very important.

*This page is intentionally left blank.*

# Human Health and Disease

## PRACTICE QUESTIONS

### Common Diseases

- Which scientist, along with Norman Borlaug, brought '*Green Revolution*' to India?  
(a) Kartikeyan (b) Murlidharan  
(c) Swaminathan (d) Khurana
- \_\_\_\_\_ varieties of wheat brought '*Green Revolution*' to India.  
(a) American (b) Mexican  
(c) Peruvian (d) Chilean
- Greeks like Hippocrates and Indian Ayurveda system considered health as \_\_\_\_\_.  
(a) Imbalance of certain 'humors' (b) Absence of certain 'humors'  
(c) Balance of certain 'humors' (d) Presence of certain 'humors'
- People with \_\_\_\_\_ were believed to have hot personality and would have fevers.  
(a) Black bile (b) Yellow bile  
(c) Green bile (d) Brown bile
- Who discovered blood circulation?  
(a) William Harvey (b) Landsteiner  
(c) J. F. Watson (d) Edison
- Which device was used by William Harvey to disprove 'good humor' hypothesis of health?  
(a) Cardiograph (b) Sphygmomanometer  
(c) Thermometer (d) Barometer
- Which system of the human body is actually responsible for maintaining health?  
(a) Neuronal system (b) Circulatory system  
(c) Endocrine system (d) Immune system
- Health is affected by  
(a) Genetic disorders (b) Infections  
(c) Life style (d) All of these
- A state of complete physical, mental and social well-being is termed as  
(a) Disease (b) Comfort  
(c) Health (d) Hygiene
- Good health can be maintained by  
(a) Balanced diet (b) Personal hygiene  
(c) Regular exercise (d) All of these

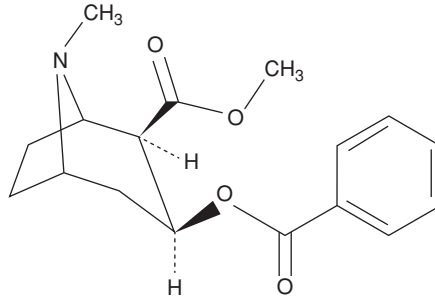
11. \_\_\_\_\_ has been practised since time immemorial to achieve physical and mental health.  
 (a) Sports (b) Yoga (c) Aerobics (d) Gym

12. Which disease is shown in the figure?



- (a) Malaria (b) Kala azar (c) Filariasis (d) Ascariasis
13. Diseases which are transmitted from person to person are called  
 (a) Non-infectious (b) Genetic  
 (c) Infectious (d) Deadly
14. An infectious disease which is fatal is  
 (a) Cold (b) Conjunctivitis  
 (c) AIDS (d) Cholera
15. Disease causing organisms are known as  
 (a) Vectors (b) Pathogens (c) Carriers (d) Parasites
16. Pathogens have to \_\_\_\_\_ within the environment of the host.  
 (a) Adapt to attach (b) Adapt to only body temperature  
 (c) Adapt to life (d) Adapt to mutation
17. Typhoid fever in humans is caused by  
 (a) Rotavirus (b) Salmonella typhi  
 (c) Escherichia coli (d) Amoeba
18. Salmonella *typhi* generally enters which part of the alimentary canal?  
 (a) Stomach (b) Large intestine  
 (c) Small intestine (d) Mouth
19. *S. typhi* spreads through  
 (a) Air (b) Sexual contact  
 (c) Contaminated food and water (d) Physical touch
20. Sustained high fever (39° to 40° C) and intestinal perforation in severe cases is a symptom of which disease?  
 (a) Malaria (b) Typhoid  
 (c) Cholera (d) Common cold

21. Which test is performed to confirm typhoid fever?  
 (a) ELISA test (b) Widal test  
 (c) Biopsy (d) Schick test
22. I was a cook by profession and spread typhoid through the food I used to cook.  
 (a) Madam Curie (b) Mary Mallon  
 (c) Rosalind Franklin (d) G. J Mendel
23. What is shown in the figure?

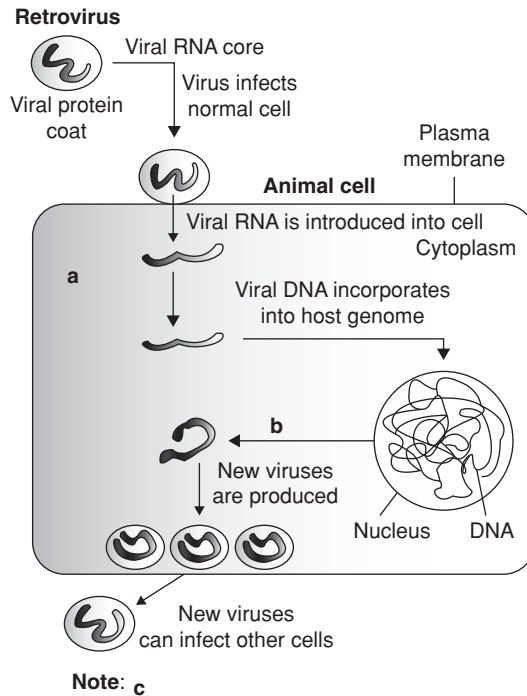


- (a) Cannabinoid molecule (b) Morphine  
 (c) Nicotine (d) Lobeline
24. Pneumonia is caused by  
 (a) *Streptococcus pneumoniae* (b) *Pneumococcal pneumonia*  
 (c) *Haemophilus influenzae* (d) All of these
25. Which part of the lungs is infected in pneumonia?  
 (a) Alveoli (b) Trachea  
 (c) Bronchus (d) Terminal bronchioles
26. In which disease, lips and fingernails turn grey and in severe cases bluish?  
 (a) Jaundice (b) Pneumonia  
 (c) Typhoid (d) Malaria
27. Which of the following is not a bacterial disease?  
 (a) Dysentery (b) Plague  
 (c) Polio (d) Diphtheria
28. Pneumonia is spread by  
 (a) Inhaling droplets/aerosols (b) Mosquito  
 (c) Reusing syringes (d) Genetic disease
29. Common cold is caused by  
 (a) Tobacco mosaic virus (b) Rhino virus  
 (c) Rota virus (d) Adeno virus
30. In common cold, which part of respiratory system is not infected?  
 (a) Nose (b) Respiratory passage  
 (c) Lungs (d) All of these

31. What is the one thing that is common between common cold and pneumonia?
- Both are caused by same pathogen.
  - Both are caused by same vector.
  - Both are caused by droplet infection.
  - Both are incurable.
32. Malaria is caused by which species of plasmodium?
- P. vivax*
  - P. malaria*
  - P. falciparum*
  - All of these
33. Plasmodium is a
- Bacterium
  - Virus
  - Protozoan
  - Fungi
34. The most serious form of malaria, malignant malaria is caused by
- P. falciparum*
  - P. vivax*
  - P. malariae*
  - All of these
35. Plasmodium enters the human body as \_\_\_\_\_.
- Merozoite
  - Trophozoite
  - Hypnozoite
  - Sporozoite
36. The vector of plasmodium is
- Male anopheles mosquito
  - Female anopheles mosquito
  - Aedes aegypti*
  - Sandworm
37. In malaria, fever and chills occur every 3 to 4 days due to rupture of RBCs and release of which toxic substance?
- Haemophilia
  - Hematocrit
  - Hemozoin
  - Haemoglobin
38. Sporozoites in mosquitoes are stored in
- Intestine
  - Mouth
  - Salivary glands
  - Proboscis
39. Malarial parasites require two hosts. They are
- Humans, female anopheles mosquito
  - Humans, *Aedes Egypti*
  - Cattle, female anopheles mosquito
  - Cattle, *Aedes Egypti*
40. After the injection of sporozoites in the blood of humans, which organ do they travel initially?
- Lymph nodes
  - Brain
  - Lungs
  - Liver
41. The plasmodium parasite reproduces in liver by \_\_\_\_\_ and in blood by \_\_\_\_\_.
- Sexual reproduction, asexual reproduction
  - Asexual reproduction, sexual reproduction
  - Spore formation, sexual reproduction
  - Sexual reproduction, spore formation
42. *Entamoeba histolytica* causes \_\_\_\_\_ in humans.
- Histolysis
  - Amoebiasis
  - Catharsis
  - Sporogenesis

43. Stool with excess of mucous and blood clots is known as  
 (a) Diarrhoea (b) Dysentery  
 (c) Both (a) and (b) (d) None of these
44. Carrier for amoebiasis is  
 (a) Entamoeba histolytica (c) Mosquito  
 (c) House flies (d) Plasmodium vivax

Figure given for questions 45–47.



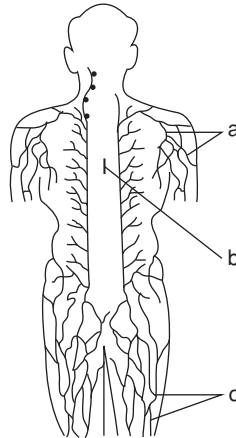
45. What is indicated by 'a' in the figure?  
 (a) Viral RNA produced by RNA polymerase.  
 (b) Viral DNA produced by DNA polymerase.  
 (c) Viral DNA produced by Reverse transcriptase.  
 (d) Viral RNA produced by reverse transcriptase.
46. What is indicated by 'b'?  
 (a) New viral RNA (b) New viral DNA  
 (c) New viral Proteins (d) New viral Cell
47. What is indicated by 'c' in the figure?  
 (a) Infected cell survives (b) Infected cell dies  
 (c) Virus being replicated (d) Both (a) and (c)



48. Ascaris is also known as  
(a) Common roundworm (b) Common whipworm  
(c) Common threadworm (d) Common pinworm
49. In humans, ascaris causes  
(a) Filariasis (b) Ascites  
(c) Ascariasis (d) Malaria
50. Symptoms like internal bleeding, muscular pain, fever, anaemia and blockage of intestinal passage occur in which disease?  
(a) Typhoid (b) Ascariasis  
(c) Malaria (d) Pneumonia
51. Contaminated water, vegetables and fruits with eggs of round worm causes  
(a) Filariasis (b) Ascariasis  
(c) Malaria (d) Pneumonia
52. Filariasis is also known as  
(a) Ascariasis (b) Elephantiasis  
(c) Ringworm (d) Amoebiasis
53. Wuchereria causes which disease in humans?  
(a) Amoebiasis (b) Filariasis  
(c) Ascariasis (d) Ringworm
54. W. bancrofti infects which part of the human body?  
(a) Blood vessels of upper limbs (b) Lymph vessels of lower limb  
(c) Blood vessels of lower limb (d) Lymph vessels of upper limb
55. Wuchereria causes  
(a) Acute inflammation (b) Chronic inflammation  
(c) Bacterial inflammation (d) Viral inflammation
56. Elephantiasis is caused by the bite of  
(a) W. malayi (b) Elephants  
(c) Female mosquito (d) Male mosquito
57. Ringworm is caused by  
(a) Round worm (b) Bacteria  
(c) Fungi (d) Virus
58. Which fungal genera are not responsible for causing ringworm?  
(a) Megasperum (b) Trichophyton  
(c) Epidermophyton (d) None of these
59. Which are the main symptoms of ringworm?  
(a) Appearance of worms on skin (b) Appearance of dry scaly lesions  
(c) Inflammation of limbs (d) Fever and chills
60. Which factors are necessary for the growth of fungi?  
(a) Moisture and sebum (b) Heat and hair  
(c) Body odour (d) Heat and moisture

61. In ringworm which parts of the body are usually affected?  
 (a) Skin, hair and scalp (b) Skin, nails and hands  
 (c) Skin, hair and lips (d) Skin, nails and scalp
62. Combs of individuals infected with \_\_\_\_\_ can transmit the disease.  
 (a) Seborrhiasis (b) Dermatitis  
 (c) Ringworm (d) Dandruff

**Figure given for questions 63–65.**



63. What is indicated by 'a' in the figure?  
 (a) Lymph vessels (b) Lymph nodes  
 (c) Lymph valves (d) Tonsillar capsule
64. What is indicated by 'c' in the figure?  
 (a) Lymph vessels (b) Lymph nodes  
 (c) Lymph valves (d) Tonsillar capsule
65. What does 'b' represent in the figure?  
 (a) Thyroid (b) Tonsil  
 (c) Thymus (d) Trachea
66. Ringworms are generally acquired from  
 (a) Water (b) Air (c) Soil (d) Food
67. The mosquito larvae are fed upon by  
 (a) Ambrosia (b) Gambusia  
 (c) Mosquito repellent (d) Turtles
68. Dengue is caused by which vector?  
 (a) Anopheles mosquito (b) Aedes mosquito  
 (c) Apollo mosquito (d) Plasmodium
69. A deadly disease, small pox has been eradicated through  
 (a) Antiserum (b) Vaccination  
 (c) Cauterisation (d) Antidote

70. Chikungunya is spread by the vector  
 (a) Fungal spores (b) Housefly (c) Mosquito (d) Reptiles

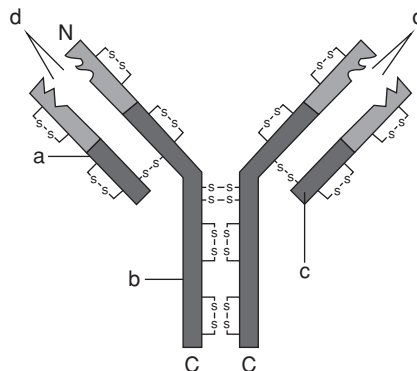
### Immunity

71. Every day our body is exposed to a large number of infectious agents. But all are not capable of causing disease. This is due to  
 (a) Decreased virulence of pathogen (b) Immunity of an individual  
 (c) Genotype of an individual (d) Lifestyle of an individual
72. Innate immunity is a \_\_\_\_\_ type of defense mechanism.  
 (a) Specific (b) Non-specific (c) Congenital (d) Both (b) and (c)
73. Skin and mucus is which type of barrier under innate immunity?  
 (a) Physiological (b) Morphological (c) Physical (d) Cellular
74. Saliva in mouth and tears from eye protects from microbial infection. This type of barrier is known as  
 (a) Cellular (b) Physical (c) Physiological (d) Cytokine
75. Which of the following is not a cellular barrier of innate immunity?  
 (a) PMNL-Neutrophils (b) Monocytes  
 (c) Lymphocytes (d) Thrombocytes
76. Virus infected cells secrete a protein called \_\_\_\_\_ to protect other non-infected cells.  
 (a) Cytokine (b) Immunoglobulin (c) Interferon (d) Clotting factors
77. Acquired immunity is  
 (a) Pathogen specific (b) Pathogen non-specific  
 (c) Congenital (d) Non-effective

### Cancer

78. Acquired immunity has which of the following features?  
 (a) Non-specific (b) Memory (c) Anti-cancer (d) Congenital
79. When a pathogen comes in contact with body for the first time, it causes a \_\_\_\_\_ response of low intensity.  
 (a) Anamnestic (b) Anaphylactic (c) Primary (d) Secondary

### Figure given for questions 80–200.



80. What is indicated by 'd' in the figure?  
(a) Light chain (b) Heavy chain  
(c) Antigen binding site (d) CMI
81. What does 'a' represent in the figure?  
(a) Light chain (b) Heavy chain  
(c) Antigen binding site (d) CMI
82. What is indicated by 'b' in the figure?  
(a) CMI (b) Heavy chain  
(c) Light chain (d) Antigen binding site
83. If a pathogen gains access to the body the second time then a highly intensified response called \_\_\_\_\_ may occur.  
(a) Analgesia (b) Anamnestic  
(c) Anthropologic (d) Arthus reaction
84. The army of proteins produced by B-lymphocytes is called  
(a) Antigen (b) Interferons  
(c) Cytokines (d) Antibodies
85. The two types of lymphocytes responsible for immune response are  
(a) A-type (b) B-type  
(c) T-type (d) Both (b) and (c)
86. The immunity conferred by B-lymphocytes is also known as  
(a) Immediate (b) Histological  
(c) Humoral (d) Cell-mediate
87. Which lymphocytes help B-cells to secrete antibodies?  
(a) Nature killer (b) Macrophages (c) T-cells (d) Monocytes
88. An antibody has \_\_\_\_\_ heavy chains and \_\_\_\_\_ light chains respectively.  
(a) 2, 4 (b) 4, 2 (c) 2, 2 (d) 1, 2
89. An antibody is represented as  
(a)  $H_1 L_2$  (b)  $H_2 L_2$  (c)  $H_4 L_1$  (d)  $H_4 L_4$
90. Select the correct option  
(a) Ig A, Ig G, Ig E, Ig D, Ig I (b) Ig G, Ig A, Ig G, Ig H, Ig J  
(c) Ig A, Ig G, Ig E, Ig D, Ig M (d) Ig M, Ig A, Ig E, Ig I, Ig G
91. The chains of antibodies are held together by  
(a) Dihydrogen (b) Covalent  
(c) Disulfide (d) Ionic
92. The immunity conferred by T-lymphocyte is known as  
(a) Humoral mediated (b) Tissue mediated  
(c) Cell mediated (d) Neurally mediated
93. After any graft/transplant which medications does a patient have to take all his/her life?  
(a) Immunomodulators (b) Immunosuppressants  
(c) Immuno Competors (d) Immuno depressants

94. Before any graft/organ transplant, which procedure should be performed?  
 (a) Tissue matching (b) Pedigree analysis  
 (c) CT scan (d) X-ray

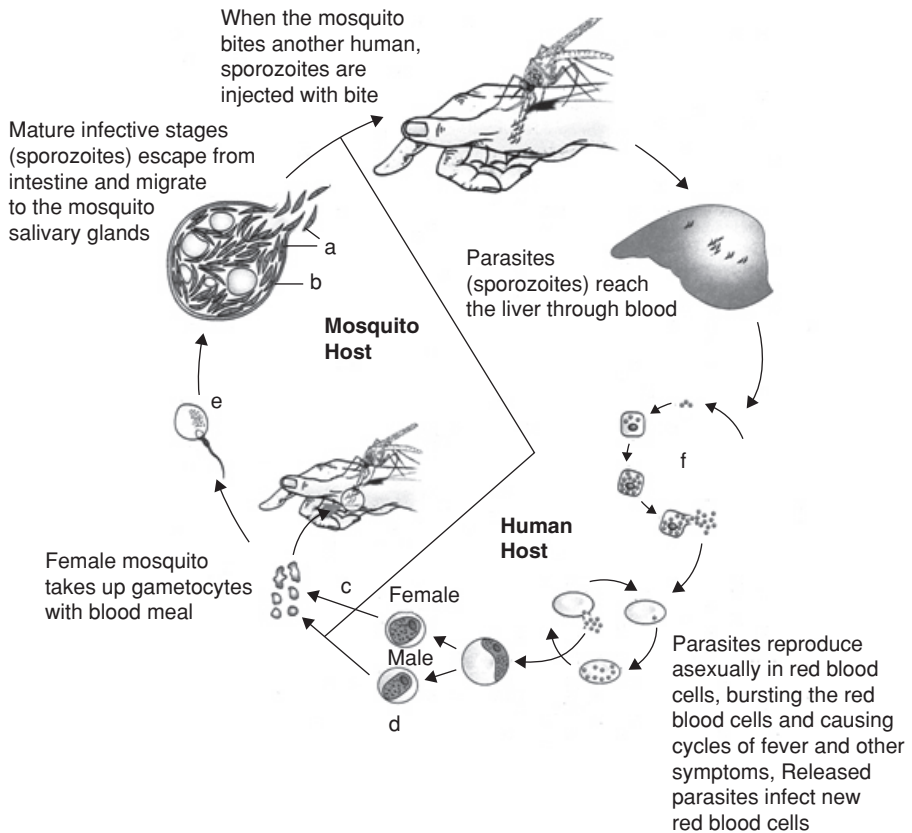
95. What is shown in the figure?



- (a) Sunflower plant (b) Poppy plant  
 (c) Datura plant (d) Tobacco plant
96. Which immune response makes graft rejection obvious?  
 (a) Humoral mediated (b) Innate immunity  
 (c) Cell mediated (d) Acquired immunity
97. Which immunity is slow and takes time for full effective response?  
 (a) Active (b) Passive  
 (c) Acquired (d) Innate
98. When a host is exposed to antigens, antibodies are produced in the host body. This type of immunity is known as \_\_\_\_\_.  
 (a) Passive (b) Active  
 (c) Innate (d) Cell mediated
99. Active immunity is induced by  
 (a) Injecting prepared antibodies (b) Injecting live infectious microbes  
 (c) Injecting dead microbes or proteins (d) Injecting vaccine
100. When readymade antibodies are given to protect the body against foreign agents, it is called \_\_\_\_\_ immunity.  
 (a) Passive (b) Active (c) Innate (d) Humoral

101. In initial days of lactation, the mother's milk 'Colostrum' is rich in which antibody?  
(a) Ig A                      (b) Ig E                      (c) Ig M                      (d) Ig G
102. Foetus receives \_\_\_\_\_ from mother through the placenta during pregnancy.  
(a) Antigens                      (b) Antibodies  
(c) T-cells                      (d) B-cells
103. Principle of \_\_\_\_\_ is based on the property of 'memory' of the immune system.  
(a) Passive immunity                      (b) Antigen antibody  
(c) Immunization                      (d) Agglutination
104. Immunization is also known as  
(a) Passive immunity                      (b) Innate immunity  
(c) Vaccination                      (d) Resistance
105. A vaccine is  
(a) Prepared antigenic proteins  
(b) Inactivated/weakened pathogen  
(c) Live pathogens  
(d) Both (a) and (b)
106. When a quick immune response is required, we can  
(a) Directly inject weakened pathogen at times of emergency.  
(b) Directly inject preformed antigens.  
(c) Directly inject preformed antibodies.  
(d) Directly inject immunosuppressants.
107. In Tetanus case we inject  
(a) Antigenic proteins                      (b) Antibodies  
(c) Weakened pathogen                      (d) Saline
108. When a person is bitten by snake, we inject antitoxin in the patient. This type of immunity is known as  
(a) Active immunization                      (b) Passive immunization  
(c) Innate immunization                      (d) Humoral immunity
109. Antigenic polypeptides of pathogen has been produced on a large scale. This is due to \_\_\_\_\_ technology.  
(a) Polymerase chain reaction                      (b) DNA fingerprinting  
(c) Recombinant DNA technology                      (d) In vitro fertilization
110. By using recombinant DNA technology, hepatitis B vaccine is produced from \_\_\_\_\_.  
(a) Bacteria                      (b) Yeast  
(c) Fungi                      (d) Lichen
111. A sudden episode of sneezing-wheezing when you travel to a new place is due to \_\_\_\_\_ response.  
(a) Inflammation                      (b) Allergic  
(c) Autoimmune                      (d) Cell mediated immunity
112. Substances which cause allergy are known as  
(a) Mutagens                      (b) Irritants  
(c) Allergens                      (d) Agglutinogens

Figure given for questions 112–116.

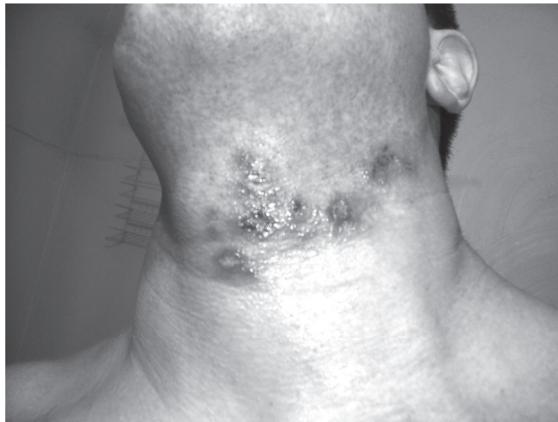


113. Which life cycle is indicated in the figure?
- (a) Amoeba  
(b) Plasmodium  
(c) Paramecium  
(d) Filarial parasite
114. What is indicated by 'a' in the figure ?
- (a) Merozoites  
(b) Hypnozoites  
(c) Sporozoites  
(d) Gametocytes
115. What is indicated by 'b' in the figure?
- (a) Gametocyte  
(b) Salivary gland  
(c) Proboscis  
(d) Merozoites
116. Gametes are developing in which cells as shown by phase 'd' in the figure?
- (a) WBC  
(b) RBC  
(c) Lymphocytes  
(d) Hepatocytes
117. Which cells is bursting as shown by phase 'f' in the figure?
- (a) WBC  
(b) RBC  
(c) Lymphocytes  
(d) Hepatocytes

118. The antibodies primarily participating in allergic response are  
(a) IgA (b) IgE (c) IgG (d) IgM
119. Which of the following is an allergen?  
(a) Dust (b) Pollen  
(c) Animal dander (d) All the above
120. Which of the following is not an allergic reaction symptom?  
(a) Sneezing (b) Watery eyes  
(c) Difficulty in breathing (d) Hiccups
121. Which cells actively participate in allergic reaction?  
(a) Mast cell (b) Monocytes  
(c) Lymphocytes (d) macrophages
122. In an allergic reaction, which chemicals are released by the mast cells?  
(a) Histamine and serotonin (b) Histamine and secretin  
(c) Serotonin and adrenalin (d) Serotonin and Noradrenaline
123. In case of allergy, which drugs reduce the symptoms?  
(a) Antihistamine (b) Adrenaline  
(c) Steroids (d) All the above
124. In autoimmune disorders, the cells  
(a) Produce more antibodies (b) Produce less antibodies  
(c) Start attacking other body cells (d) Have exaggerated immune response
125. An example of autoimmune disease is  
(a) Tetanus (b) Allergy  
(c) Rheumatoid arthritis (d) Asthma
126. Which of the following is a primary lymphoid organ?  
(a) Thymus (b) Spleen  
(c) Tonsils (d) Lymph nodes
127. Immature lymphocytes differentiate in  
(a) Liver and Spleen (b) Bone marrow and Thyroid  
(c) Thymus and Bone marrow (d) Spleen and Thymus
128. Which of the following is a secondary lymphoid organ?  
(a) Brunner glands (b) Peyer's patches  
(c) Crypts of lieberkuhn (d) Glisson's capsule
129. Which structure of the lymph system keeps degenerating from birth to puberty?  
(a) Spleen (b) Tonsils  
(c) Peyer's patches (d) Thymus
130. The spleen is  
(a) Butterfly shaped (b) Bean shaped  
(c) Button shaped (d) Wedge shaped
131. Thymus is responsible for maturation of which cells?  
(a) Tendons (b) B-cells  
(c) T-cells (d) Mast cells

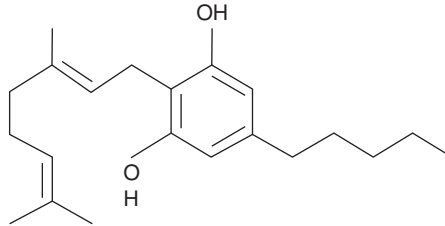


132. Which organ act as filter of the blood by trapping blood borne microorganisms?  
 (a) Spleen (b) Liver  
 (c) Tonsils (d) Bone marrow
133. Respiratory, digestive and urogenital tract has a lining of mucus along with lymph. This lining is known as  
 (a) Mucosa associated tissue (b) Mucosa assisted lymphoid tissue  
 (c) Mucosa associated lymphoid tissue (d) Mucosa assisted tissue
134. Which disease is indicated in the figure ?



- (a) Facial palsy (b) Dermatitis  
 (c) Ringworm (d) Round worm
135. In the context of lymphoid tissue, MALT constitutes about \_\_\_\_\_ of all the lymphoid tissue in human body.  
 (a) 25% (b) 60% (c) 50% (d) 90%
136. A group of symptoms is known as  
 (a) Infection (b) Syndrome (c) Disease (d) Collection
137. AIDS was first reported in the year \_\_\_\_\_.  
 (a) 1971 (b) 1981 (c) 1991 (d) 1960
138. The death toll due to AIDS has crossed \_\_\_\_\_ globally.  
 (a) 2.5 billion (b) 2500 million (c) 25 million (d) 250 million
139. AIDS is caused due to  
 (a) HIV (b) DNA virus (c) TMV (d) Bacteriophage
140. HIV belongs to a group of viruses known as  
 (a) Inverto virus (b) Retro virus  
 (c) Metro virus (d) Flavo virus
141. Retro virus causing AIDS has which kind of genome?  
 (a) DNA (b) RNA  
 (c) mRNA (d) Proteins

142. Which of the following is not a means of transmission of AIDS?  
 (a) Sexual contact with uninfected person (b) Transfusion of contaminated blood  
 (c) Sharing infected needles (d) Child born to an HIV infected mother
143. Time lag between infection and appearance of AIDS symptoms can be few months to \_\_\_\_\_ years.  
 (a) 2 to 3 (b) 5 to 10 (c) >15 (d) 1 to 2
144. Retro virus contains an enzyme to carry out biochemical activities in host. Name the enzyme.  
 (a) Polymerase (b) Exonuclease  
 (c) Reverse transcriptase (d) Ligase
145. The virus responsible for causing AIDS primarily infects?  
 (a) Monocytes (b) Mast cells  
 (c) Macrophages (d) Mucosal cells
146. What is shown in the figure?



- (a) Cannabinoid molecule (b) Morphine  
 (c) Nicotine (d) Lobeline
147. HIV enters which T-cells?  
 (a) Helper ( $T_H$ ) (b) Promoter ( $T_p$ ) (c) Suppressor ( $T_s$ ) (d) Cytotoxic ( $T_c$ )
148. Death in AIDS is due to  
 (a) Aggravated immune response (b) Due to opportunistic infections  
 (c) Due to inflammation of genitalia (d) Due to diarrhoea and fever
149. AIDS can be detected by which diagnostic test?  
 (a) Widal (b) ELISA  
 (c) SGPT (d) Blood cell count
150. The organization in India which is spreading awareness and educating people regarding AIDS is  
 (a) Gramin Yojna (b) Health Ministry  
 (c) National AIDS Control Organization (d) None of these
151. NGO stands for  
 (a) Non Governing Organization (b) Non Governmental Organization  
 (c) Non Guaranteed Object (d) Non Granted Organization
152. Normal cells in our body inhibit the uncontrolled growth of cells which they are in contact with. This is known as  
 (a) Cell-cell contact (b) Cell cycle regulation  
 (c) Contact inhibition (d) Contact response

153. Tumour is an abnormal mass of  
(a) Muscles (b) Cells  
(c) Inorganic salts (d) Cartilaginous membrane
154. The tumour which does not spread to other parts of body is known as \_\_\_\_\_.  
(a) Benign (b) Malignant  
(c) Neoplastic (d) Lymphoma
155. The cancerous cells which have the ability to proliferate and cause cancer in new locations of the body are known as  
(a) Benign (b) Lymphoma  
(c) Leukemia (d) Malignant
156. Cancer cells actively divide and grows due to  
(a) Competition for vital nutrients with normal cells.  
(b) Competition for space with normal cells.  
(c) Competition for only support.  
(d) Excess food materials stored in body.
157. Metastasis is  
(a) Normal equilibrium condition of body.  
(b) Morphological changes from larva to adult.  
(c) Generation of new tumour in different sites of body.  
(d) Abnormal growth of the body muscles.
158. The agents which can cause neoplastic cell generation are  
(a) Gamma rays (b) X-rays  
(c) UV rays (d) All of these
159. Which radiations can cause cancer?  
(a) Visible light (b) UV rays  
(c) Infra red light (d) Microwaves
160. Cancer causing viruses are known as  
(a) Retro virus (b) Oncogenic virus  
(c) Flavo virus (d) Adeno virus
161. The genes present in normal cells of the body which can cause cancer are known as  
(a) Oncogenes (b) Carcinogenes  
(c) Neogenes (d) Tumerogenes
162. Proto-oncogenes are also abbreviated as  
(a) p-onc (b) c-onc  
(c) p-con (d) c-con
163. Blood and bone marrow tests are usually performed to detect  
(a) Anaemia (b) Leukaemia  
(c) Thrombocytopenia (d) Filariasis
164. In case of \_\_\_\_\_, a piece of suspected tissue is cut into thin sections, stained and examined under microscope.  
(a) Post mortem (b) Biopsy  
(c) DNA fingerprinting (d) Pedigree analysis

165. Cancers of internal organs can be detected by  
(a) Radiography (b) CT  
(c) MRI (d) All of these
166. In which technique 3-D the image of the internals of an object are generated?  
(a) Electron microscopy  
(b) Radiography  
(c) Computed tomography  
(d) Magnetic Resonance Imaging
167. MRI uses strong magnetic field and \_\_\_\_\_ radiations to detect pathological and physiological changes.  
(a) Ionizing (b) Non-ionizing  
(c) LASER (d) X-ray
168. Tobacco smoke primarily causes  
(a) Mouth cancer (b) Lung cancer  
(c) Breast cancer (d) Bladder cancer
169. The common approaches for treatment of cancer are  
(a) Surgery (b) Radiation therapy  
(c) Immuno therapy (d) All of these
170. Anti-cancer drugs have the following side effects  
(a) Hair loss (b) Anaemia  
(c) Vomiting (d) All of these
171. For the treatment of cancer, biological response modifiers such as \_\_\_\_\_ are given.  
(a)  $\beta$ -interferons (b)  $\gamma$ -interferons  
(c)  $\alpha$ -interferons (d)  $\delta$ -interferons
172. Heroin is locally known as \_\_\_\_\_.  
(a) Smack (b) Angel dust  
(c) Coke (d) Marijuana
173. Smack is chemically  
(a) Dicetylmorphine (b) Diacetylmorphine  
(c) Dimethyl morphine (d) Dihydromorphine
174. Morphine is obtained from  
(a) Erythrolyum coca (b) Atropa belladonna  
(c) Cannabis sativa (d) Papaver somniferum
175. Heroin is a \_\_\_\_\_ drug.  
(a) Excitatory (b) Depressant  
(c) Hallucinogenic (d) Euphoric
176. Morphine is extracted from \_\_\_\_\_ of poppy plant.  
(a) Leaf (b) Latex (c) Fruit (d) Flower
177. Cannabinoids are obtained from \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ of cannabis sativa.  
(a) leaves, flowers, fruits (b) leaves, flower tops, resin  
(c) leaves, flowers, latex (d) flower, seed, tannins

178. What is shown in the figure?



- (a) Opium  
(c) Cannabis
- (b) Datura  
(d) Tobacco
179. Cannabinoids are mainly known to affect?  
(a) Cardio vascular system  
(c) Sensory system
- (b) Nervous system  
(d) Excretory system
180. Charas, ganja, hashish and marijuana are all  
(a) Opioids  
(c) Coca alkaloids
- (b) Cannabinoids  
(d) Barbiturates
181. Cocaine is obtained from  
(a) *Erythroxylum coca*  
(c) *Atropa belladonna*
- (b) *Paper somniferum*  
(d) *Connalris sativa*
182. Coca plant is a native to  
(a) North America  
(c) South Africa
- (b) South America  
(d) Australia
183. Cocaine is commonly known as  
(a) Smack  
(c) Crack
- (b) Coke  
(d) Both (b) and (c)
184. Cocaine produces a sense of \_\_\_\_\_.  
(a) Euphoria  
(c) Depression
- (b) Dysphoria  
(d) Androgenic effects
185. Excessive dosage of cocaine causes \_\_\_\_\_.  
(a) Cardiovascular collapse  
(c) Nerve damage
- (b) Hallucinations  
(d) Vomiting
186. *Atropa belladonna* is  
(a) Ornamental plant  
(c) Immunomodulator plant
- (b) Hallucinogenic plant  
(d) Depressant plant
187. Generally, cannabinoids are taken  
(a) Intravenously  
(c) Through oral route
- (b) Intramuscularly  
(d) Through implants
188. LSD is  
(a) Lauric Acid Dimethyl Amide  
(c) Lysergic Acid Diethyl Amide
- (b) Lysergic Acid Dimethyl Amide  
(d) Lysergic Acid Diethyl amine

189. \_\_\_\_\_ is a very effective pain-killer and sedative used for patients who have undergone surgery.
- (a) Paracetamol (b) Morphine  
(c) LSD (d) Barbiturate
190. Datura is a \_\_\_\_\_ plant.
- (a) Sedative (b) Hallucinogenic  
(c) Excitatory (d) Health tonic
191. AIDS do not spread by
- (a) Sexual contact (b) Body fluids  
(c) Physical touch (d) Blood transfusion
192. Treatment of AIDS with anti-retro viral drugs is
- (a) Not at all effective (b) Fully effective  
(c) Partially effective (d) Leads to secondary infections
193. When plants having hallucinogenic properties are administered in more than required amount/frequency, it causes
- (a) Addiction (b) Drug abuse  
(c) Cancer (d) Both (a) and (b)
194. Barbiturates and Benzodiazepines are used in clinical conditions like
- (a) Cancer and its prevention (b) Euphoria and sense of well-being  
(c) Depression and insomnia (d) Increasing body strength and vigour
195. Tobacco has been used by human beings for more than \_\_\_\_\_ years.
- (a) 400 millions (b) 40 millions  
(c) 4000 millions (d) 400
196. Tobacco contains an alkaloid known as \_\_\_\_\_.
- (a) Morphine (b) Piperine  
(c) Nicotine (d) Anabasine
197. Nicotine stimulates which gland primarily?
- (a) Salivary (b) Pancreas  
(c) Spleen (d) Adrenal
198. What is the effect of nicotine?
- (a) Relieves stress and anxiety  
(b) It gives a sense of well-being and happiness  
(c) It raises blood pressure and heart rate  
(d) It causes excess of acidity
199. Smoking increases the content of which compound in blood?
- (a)  $\text{CO}_2$  (b) CO (c)  $\text{H}_2\text{CO}_3$  (d)  $\text{H}_2\text{O}_2$
200. Adolescent period ranges from \_\_\_\_\_ years.
- (a) 10 to 16 (b) 12 to 18 (c) 13 to 19 (d) 11 to 20
201. Adolescence is a bridge linking \_\_\_\_\_ and \_\_\_\_\_.
- (a) Teenage and marriage (b) Childhood and adulthood  
(c) Teenage and adulthood (d) Birth and adulthood

202. \_\_\_\_\_ is a psychological attachment to certain effects like euphoria associated with drugs and alcohol?
- (a) Hallucinations (b) Addiction  
(c) Delusion (d) Ilusion
203. If regular dose of drugs/alcohol is abruptly discontinued it causes \_\_\_\_\_.
- (a) Hallucinations (b) Withdrawal syndrome  
(c) Diversion to criminal activities (d) Severe depression
204. Death in case of overdose of drugs occurs due to
- (a) Respiratory failure (b) Heart failure  
(c) Cerebral hemorrhage (d) All of these
205. Drug abusers can suffer from infections like
- (a) Hepatitis (b) Depression  
(c) Euphoria (d) Cirrhosis
206. Chronic alcoholism damages which vital organ of the body?
- (a) Heart (b) Kidney  
(c) Liver (d) Brain
207. Generally sportsmen abuse which categories of drugs?
- (a) Immuno modulators (b) Anabolic steroids  
(c) Cannabinoids (d) Potent pain killers
208. Which categories of drugs are used by sportsmen?
- (a) Certain hormones (b) Anabolic steroids  
(c) Diuretics (d) All of these
209. Liver damage is termed as
- (a) Leeching (b) Cirrhosis  
(c) Aplasia (d) Haemorrhage
210. If females are administered anabolic steroids, which of the following symptoms are observed?
- (a) Abnormal menstruation (b) Excessive hair growth  
(c) Enlargement of clitoris (d) All of these

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.
211. **Assertion:** Health means absence of disease.  
**Reason:** Health can be defined as a state of complete physical well being only.
212. **Assertion:** Infectious diseases are very common.  
**Reason:** These diseases are easily transmitted from one person to another.

213. **Assertion:** Chill and high fever occurs due to malaria.  
**Reason:** Release of the toxin, hemozoin from ruptured RBCs in malaria.
214. **Assertion:** Ringworms generally occur in skin fold. Such as groin or between toes.  
**Reason:** Heat and moisture helps the fungi to grow.
215. **Assertion:** Saliva in mouth is physiological barriers.  
**Reason:** Interferon are cytokine barriers.
216. **Assertion:** Yellowish fluid colostrum secreted by mother during the initiated days of lactation is protective for infant.  
**Reason:** Colostrum contains abundant IgA antibodies.
217. **Assertion:** Rheumatoid arthritis is an autoimmune disease.  
**Reason:** Body attack self-cells in rheumatoid arthritis.
218. **Assertion:** HIV enters in macrophages only in human body.  
**Reason:** In macrophages, the RNA genome of virus get incorporated into host cell DNA as such.
219. **Assertion:** Cancer cells shows uncontrolled growth.  
**Reason:** Cancer cells losses property of contact inhibition.
220. **Assertion:** Crack is a potent stimulant of CNS, producing sense of euphoria and increased energy.  
**Reason:** It interferes with the transport of neurotransmitter dopamine.
221. **Assertion:** Innate immunity is present by birth.  
**Reason:** Innate immunity is non specific type of defence.
222. **Assertion:** PMNL are cellular barriers.  
**Reason:** Acid in stomach is physiological barrier.
223. **Assertion:** Non infected cells can be protected from virus by interferons.  
**Reason:** Non infected cells secrete protein called interferons.
224. **Assertion:** Our body elicits highly intensified secondary response for same pathogens.  
**Reason:** Our body contain memory T - cells.
225. **Assertion:** An Antibody is represented by  $H_2L_2$ .  
**Reason:** Each antibody molecule has four peptide chains two light and two heavy chains.
226. **Assertion:** Number of disease like polio, diphtheria, pneumonia and tetanus have been controlled to large extent  
**Reason:** Vaccines are prepared against these diseases.
227. **Assertion:** In tetanus preformed antibodies are given to patient.  
**Reason:** Quick immune response is required in tetanus.
228. **Assertion:** Body is able to reject organ taken from other recipient.  
**Reason:** Our body posses cell mediated immune response responsible for graft rejection.
229. **Assertion:** Bone marrow and thymus are primary lymphoid organs.  
**Reason:** Immature lymphocytes differentiate and proliferate in these organs.

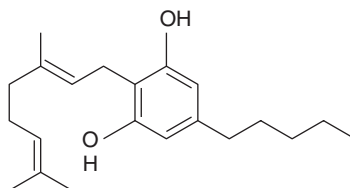
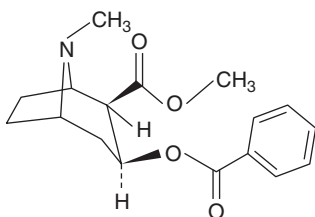


## PREVIOUS YEAR QUESTIONS

1. The fastest distribution of some injectible material/medicine and with no risk of any kind can be achieved by injecting it into the [AIPMT MAINS 2010]
- (a) Muscles (b) Arteries  
(c) Veins (d) Lymph vessels
2. Which one of the following techniques is safe for the detection of cancers? [AIPMT MAINS 2010]
- (a) Magnetic resonance imaging (MRI) (b) Radiography (X-ray)  
(c) Computed Tomography (CT) (d) Histopathological studies
3. A person suffering from a disease caused by Plasmodium, experiences recurring chill and fever at the time when? [AIPMT MAINS 2010]
- (a) The sporozoites released from RBCs are being rapidly killed and broken down inside spleen.  
(b) The trophozoites reach maximum growth and give out certain toxins.  
(c) The parasite after its rapid multiplication inside RBCs ruptures them, releasing the stage to enter fresh RBCs.  
(d) The microgametocytes and megagametocytes are being destroyed by the WBCs.
4. Select the correct statement from the ones given below. [AIPMT PRE 2010]
- (a) Barbiturates when given to criminals make them tell the truth.  
(b) Morphine is often given to persons who have undergone surgery as a pain killer.  
(c) Chewing tobacco lowers blood pressure and heart rate.  
(d) Cocaine is given to patients after surgery as it stimulates recovery.
5. Ringworm in humans is caused by [AIPMT PRE 2010]
- (a) Bacteria (b) Fungi  
(c) Nematodes (d) Viruses
6. Widal test is used for the diagnosis of [AIPMT PRE 2010]
- (a) Malaria (b) Pneumonia  
(c) Tuberculosis (d) Typhoid
7. Which one of the following statements is correct with respect to AIDS? [AIPMT PRE 2010]
- (a) The HIV can be transmitted through eating food together with an infected person.  
(b) Drug addicts are least susceptible to HIV infection.  
(c) AIDS patients are being fully cured 100 per cent with proper care and nutrition.  
(d) The causative HIV retrovirus enters helper T-lymphocytes thus reducing their numbers.
8. Consider the following four statements (1 to 4) regarding kidney transplant and select the two correct ones out of these. [AIPMT PRE 2010]



15. Common cold is not cured by antibiotics because it is [AIPMT MAINS 2011]
- Caused by a virus
  - Caused by a gram-positive bacterium
  - Caused by a gram-negative bacterium
  - Not an infectious disease
16. Select the correct statement with respect to diseases and immunization. [AIPMT MAINS 2011]
- If due to some reason B and T lymphocytes are damaged, the body will not produce antibodies against a pathogen.
  - Injection of dead/inactivated pathogens causes passive immunity.
  - Certain protozoans have been used in mass production of hepatitis B vaccine.
  - Injection of snake antivenom against snake bite is an example of active immunization.
17. Which one of the following human organs is often called the 'graveyard' of RBCs? [AIPMT MAINS 2012]
- Kidney
  - Spleen
  - Liver
  - Gall bladder
18. Identify the molecules (a) and (b) shown below and select the right option giving their source and use.



[AIPMT MAINS 2012]

**Options:**

- | Molecule            | Source             | Use                                      |
|---------------------|--------------------|------------------------------------------|
| (a) (b) Heroin      | Cannabis sativa    | Depressant and slows down body functions |
| (b) (b) Cannabinoid | Atropa belladonna  | Produces hallucinations                  |
| (c) (a) Morphine    | Papaver somniferum | Sedative and pain killer                 |
| (d) (a) Cocaine     | Erythroxylum coca  | Accelerates the transport of dopamine    |
19. Which one of the following organisms is scientifically and correctly named, correctly printed according to the International Rules of Nomenclature and correctly described? [AIPMT MAINS 2012]
- Plasmodium falciparum – a protozoan pathogen causing the most serious type of malaria.
  - Felis tigris – The Indian tiger is well protected in Gir forests.
  - E. Coli – The full name is Entamoeba coli, a commonly occurring bacterium in human intestine.
  - Musca domestica – The common house lizards, a reptile.
20. Which one of the following statements is correct with respect to immunity? [AIPMT MAINS 2012]

- (a) The antibodies against small pox pathogen are produced by T-lymphocytes.  
(b) Antibodies are protein molecules each of which has four light chains.  
(c) Rejection of a kidney graft is the function of B-lymphocytes.  
(d) Preformed antibodies need to be injected to treat the bite by a viper snake.
21. The first clinical gene therapy was given for treating [AIPMT MAINS 2012]  
(a) Chicken pox (b) Rheumatoid arthritis  
(c) Adenosine deaminase deficiency (d) Diabetes mellitus
22. Motile zygote of plasmodium occurs in [AIPMT PRE 2012]  
(a) Gut of female anopheles (b) Salivary glands of anopheles  
(c) Human RBCs (d) Human liver
23. Widal test is carried out to test [AIPMT PRE 2012]  
(a) Malaria (b) Diabetes mellitus  
(c) HIV/AIDS (d) Typhoid fever
24. Common cold differs from pneumonia in, that: [AIPMT PRE 2012]  
(a) Pneumonia is a communicable disease whereas the common cold is a nutritional deficiency disease.  
(b) Pneumonia can be prevented by a live attenuated bacterial vaccine whereas the common cold has no effective vaccine.  
(c) Pneumonia is caused by a virus while the common cold is caused by the bacterium haemophilus influenzae.  
(d) Pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage but not the lungs.
25. Which one of the following is not a property of cancerous cells whereas the remaining three are? [AIPMT PRE 2012]  
(a) They compete with normal cells for vital nutrients.  
(b) They do not remain confined in the area of formation.  
(c) They divide in an uncontrolled manner.  
(d) They show contact inhibition.
26. Cirrhosis of liver is caused by the chronic intake of [AIPMT PRE 2012]  
(a) Opium (b) Alcohol  
(c) Tobacco (chewing) (d) Cocaine
27. In which one of the following options the two examples are correctly matched with particular type of immunity? [AIPMT PRE 2012]
- | Examples                                        | Type of immunity  |
|-------------------------------------------------|-------------------|
| (a) Polymorphonuclear leukocytes and monocytes  | Cellular barriers |
| (b) Anti-tetanus and anti-snake bite injections | Active immunity   |

- |                                                                                      |                        |
|--------------------------------------------------------------------------------------|------------------------|
| (c) Saliva in mouth and tears in eyes                                                | Physical barriers      |
| (d) Mucus coating of epithelium lining the urinogenital tract and the HCl in stomach | Physiological barriers |

28. Infection of *Ascaris* usually occurs by

[AIPMT 2013]

- (a) Drinking water containing eggs of ascaris
- (b) Eating imperfectly cooked pork
- (c) Tsetse fly
- (d) Mosquito bite

29. The cell mediated immunity inside the human body is carried out by?

[AIPMT 2013]

- |                   |                   |
|-------------------|-------------------|
| (a) T-lymphocytes | (b) B-lymphocytes |
| (c) Thrombocytes  | (d) Erythrocytes  |

30. What is the particular type of drug that is obtained from the plant whose one flowering branch is shown below?

[AIPMT 2014]



- |                  |                 |
|------------------|-----------------|
| (a) Hallucinogen | (b) Depressant  |
| (c) Stimulant    | (d) Pain-killer |

31. At which stager HIV infection does one usually show symptoms of AIDS?

[AIPMT 2014]

- (a) Within 15 days of sexual contact with an infected person
- (b) When the infected retro virus enters host cells
- (c) When HIV damages large number of helper T-Lymphocytes
- (d) When the viral DNA is produced by reverse transcriptase

32. Which of the following endoparasites of humans does show viviparity?

[AIPMT 2015]

- |                                  |                                    |
|----------------------------------|------------------------------------|
| (a) <i>Ancylostoma duodenale</i> | (b) <i>Enterobius vermicularis</i> |
| (c) <i>Trichimella spiralis</i>  | (d) <i>Ascaris lumbricoides</i>    |

33. Match each disease with its correct type of vaccine:

- |                    |                        |
|--------------------|------------------------|
| (a) tuberculosis   | (i) harmless virus     |
| (b) whooping cough | (ii) inactivated toxin |
| (c) diphtheria     | (iii) killed bacteria  |
| (d) polio          | (iv) harmless bacteria |

[AIPMT 2015]

- |     |       |       |       |       |
|-----|-------|-------|-------|-------|
|     | (a)   | (b)   | (c)   | (d)   |
| (a) | (ii)  | (i)   | (iii) | (iv)  |
| (b) | (iii) | (ii)  | (iv)  | (i)   |
| (c) | (iv)  | (iii) | (ii)  | (i)   |
| (d) | (i)   | (ii)  | (iv)  | (iii) |

34. HIV that causes AIDS, first starts destroying: [AIPMT 2015]
- |                          |                  |
|--------------------------|------------------|
| (a) B-Lymphocytes        | (b) Leucocytes   |
| (c) Helper T-Lymphocytes | (d) Thrombocytes |
35. The active form of *Entamoeba histolytica* feeds upon: [AIPMT 2015]
- (a) Erythrocytes, mucosa and submucosa of colon  
 (b) Mucosa and submucosa colon only  
 (c) food in intestine  
 (d) blood only
36. Which of the following immunoglobulins does constitute the largest percentage in human milk? [RE-AIPMT 2015]
- |          |          |          |          |
|----------|----------|----------|----------|
| (a) Ig M | (b) Ig A | (c) Ig G | (d) Ig D |
|----------|----------|----------|----------|
37. If you suspect major deficiency of antibodies in a person, to which of the following would you look for confirmatory evidence? [RE-AIPMT 2015]
- |                     |                          |
|---------------------|--------------------------|
| (a) Serum albumins  | (b) Haemocytes           |
| (c) Serum globulins | (d) Fibrinogen in plasma |
38. Grafted kidney may be rejected in a patient due to [RE-AIPMT 2015]
- |                                   |                             |
|-----------------------------------|-----------------------------|
| (a) Cell-mediated immune response | (b) Passive immune response |
| (c) Innate immune response        | (d) Humoral immune response |
39. Asthma may be attributed by: [NEET - I, 2016]
- (a) Bacterial infection of the lungs  
 (b) Allergic reaction of the mast cells in the lungs  
 (c) Inflammation of the trachea  
 (d) Accumulation of fluid in the lungs
40. In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self-cells, then it leads to: [NEET - I, 2016]
- |                         |                     |
|-------------------------|---------------------|
| (a) Allergic response   | (b) Graft rejection |
| (c) Auto-immune disease | (d) Active immunity |
41. Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain [NEET - I, 2016]
- |                        |                          |
|------------------------|--------------------------|
| (a) Activate pathogens | (b) Harvested antibodies |
| (c) Gamma globulin     | (d) Attenuated pathogens |

42. Which of the following statements is not true for cancer cells in relation to mutations. [NEET - I, 2016]
- (a) Mutations in proto-oncogenes accelerate the cell cycle
  - (b) Mutations destroy telomerase inhibitor
  - (c) Mutations inactivate the cell control
  - (d) Mutations inhibit production of telomerase
43. Which of the following is correct regarding AIDS causative agent HIV? [NEET - II, 2016]
- (a) HIV is enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase
  - (b) HIV is unenveloped retrovirus
  - (c) HIV does not escape but attacks the acquired immune response
  - (d) HIV is enveloped virus containing one molecule of single-stranded RNA and one molecule of reverse transcriptase
44. Which of the following sets of disease is caused by bacteria? [NEET - II, 2016]
- (a) Typhoid and smallpox
  - (b) Tetanus and mumps
  - (c) Herpes and influenza
  - (d) Cholera and tetanus

---

### NCERT EXEMPLAR QUESTIONS

---

1. The term 'Health' is defined in many ways. The most accurate definition of the term health would be
- (a) Health is the state of body and mind in a balanced condition.
  - (b) Health is the reflection of a smiling face.
  - (c) Health is a state of complete physical, mental and social well-being.
  - (d) Health is the symbol of economic prosperity.
2. The organisms which cause diseases in plants and animals are called
- (a) Pathogens
  - (b) Vectors
  - (c) Insects
  - (d) Worms
3. The chemical test that is used for diagnosis of typhoid is
- (a) ELISA Test
  - (b) ESR Test
  - (c) PCR Test
  - (d) Widal Test
4. Diseases are broadly grouped into infectious and non-infectious diseases. In the list given below, identify the infectious diseases.
- i. Cancer
  - ii. Influenza
  - iii. Allergy
  - iv. Small pox
- (a) i and ii
  - (b) ii and iii
  - (c) iii and iv
  - (d) ii and iv
5. The sporozoites that cause infection, when a female Anopheles mosquito bites a person are formed in
- (a) Liver of per sort
  - (b) RBCs of mosquito
  - (c) Salivary glands of mosquito
  - (d) Intestine of mosquito

6. The disease chikungunya is transmitted by
- (a) House flies
  - (b) Aedes mosquitoes
  - (c) Cockroach
  - (d) Female Anopheles
7. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia?
- (a) Difficulty in respiration, fever, chills, cough, headache.
  - (b) Constipation, abdominal pain, cramps, blood clots.
  - (c) Nasal congestion and discharge, cough, sore throat, headache.
  - (d) High fever, weakness, stomach pain, loss of appetite and constipation.
8. The genes causing cancer are
- (a) Structural genes
  - (b) Expressor genes
  - (c) Oncogenes
  - (d) Regulatory genes
9. In malignant tumours, the cells proliferate, grow rapidly and move to other parts of the body to form new tumours. This stage of disease is called
- (a) Metagenesis
  - (b) Metastasis
  - (c) Teratogenesis
  - (d) Mitosis
10. When an apparently healthy person is diagnosed as unhealthy by a psychiatrist, the reason could be that
- (a) The patient was not efficient at his work.
  - (b) The patient was not economically prosperous.
  - (c) The patient shows behavioural and social maladjustment.
  - (d) He does not take interest in sports social maladjustment.
11. Which of the following are the reason(s) for Rheumatoid arthritis? Choose the correct option.
- i. The ability to differentiate pathogens or foreign molecules from self-cells increases.
  - ii. Body attacks self-cells.
  - iii. More antibodies are produced in the body.
  - iv. The ability to differentiate pathogens or foreign molecules from self-cells is lost.
- (a) I and ii                      (b) ii and iv                      (c) iii and iv                      (d) I and iii
12. AIDS is caused by HIV. Among the following, which one is not a mode of transmission of HIV?
- (a) Transfusion of contaminated blood
  - (b) Sharing the infected needles
  - (c) Shaking hands with infected persons
  - (d) Sexual contact with infected persons
13. 'Smack' is a drug obtained from the
- (a) Latex of *Papaver somniferum*
  - (b) Leaves of *Cannabis sativa*
  - (c) Flowers of *Datura*
  - (d) Fruits of *Erythroxylum coca*
14. The substance produced by a cell in viral infection that can protect other cells from further infection is
- (a) Serotonin
  - (b) Colostrum
  - (c) Interferon
  - (d) Histamine
15. Transplantation of tissues/organs to save certain patients often fails due to the rejection of such tissues/organs by the patient. Which type of immune response is responsible for such rejections?
- (a) Auto-immune response
  - (b) Humoral immune response
  - (c) Physiological immune response
  - (d) Cell-mediated immune response



16. Antibodies present in colostrum which protect the new born from certain diseases is of  
 (a) Ig G type (b) Ig A type (c) Ig D type (d) Ig E type
17. Tobacco consumption is known to stimulate the secretion of adrenaline and nor-adrenaline. The component causing this could be  
 (a) Nicotine (b) Tannic acid (c) Curamin (d) Catechin
18. The anti-venom against snake poison contains  
 (a) Antigens (b) Antigen-antibody complexes  
 (c) Antibodies (d) Enzymes
19. Which of the following is not a lymphoid tissue?  
 (a) Spleen (b) Tonsils (c) Pancreas (d) Thymus
20. Which of the following glands is large sized at birth but reduces in size with ageing?  
 (a) Pineal (b) Pituitary (c) Thymus (d) Thyroid
21. Hemozoin is a  
 (a) Precursor of haemoglobin.  
 (b) Toxin released from streptococcus infected cells.  
 (c) Toxin released from plasmodium infected cells.  
 (d) Toxin released from haemophilus infected cells.
22. One of the following is not the causal organism for ringworm.  
 (a) *Microsporium* (b) *Trichophyton* (c) *Epidermophyton* (d) *Macrosporium*
23. A person with sickle cell anaemia is  
 (a) More prone to malaria (b) More prone to typhoid  
 (c) Less prone to malaria (d) Less prone to typhoid

### Answer Keys

#### Practice Questions

1. (c) 2. (b) 3. (c) 4. (a) 5. (a) 6. (c) 7. (d) 8. (d) 9. (c) 10. (d)  
 11. (b) 12. (c) 13. (c) 14. (c) 15. (b) 16. (c) 17. (b) 18. (c) 19. (c) 20. (b)  
 21. (b) 22. (b) 23. (b) 24. (d) 25. (a) 26. (b) 27. (c) 28. (a) 29. (b) 30. (c)  
 31. (c) 32. (d) 33. (c) 34. (a) 35. (d) 36. (b) 37. (c) 38. (c) 39. (a) 40. (d)  
 41. (b) 42. (b) 43. (b) 44. (c) 45. (c) 46. (a) 47. (a) 48. (a) 49. (c) 50. (b)  
 51. (b) 52. (b) 53. (b) 54. (b) 55. (b) 56. (c) 57. (c) 58. (a) 59. (b) 60. (d)  
 61. (d) 62. (c) 63. (b) 64. (a) 65. (c) 66. (c) 67. (b) 68. (b) 69. (b) 70. (c)  
 71. (b) 72. (d) 73. (c) 74. (c) 75. (d) 76. (c) 77. (a) 78. (b) 79. (c) 80. (c)  
 81. (a) 82. (b) 83. (b) 84. (d) 85. (d) 86. (c) 87. (c) 88. (c) 89. (b) 90. (c)  
 91. (c) 92. (c) 93. (b) 94. (a) 95. (b) 96. (c) 97. (a) 98. (b) 99. (c) 100. (a)  
 101. (a) 102. (b) 103. (c) 104. (c) 105. (d) 106. (c) 107. (b) 108. (b) 109. (c) 110. (b)  
 111. (b) 112. (c) 113. (b) 114. (c) 115. (b) 116. (b) 117. (d) 118. (b) 119. (d) 120. (d)  
 121. (a) 122. (a) 123. (d) 124. (c) 125. (c) 126. (a) 127. (c) 128. (b) 129. (d) 130. (b)  
 131. (c) 132. (a) 133. (c) 134. (c) 135. (c) 136. (b) 137. (b) 138. (c) 139. (a) 140. (b)  
 141. (b) 142. (a) 143. (b) 144. (c) 145. (c) 146. (a) 147. (a) 148. (b) 149. (b) 150. (c)

151. (b) 152. (c) 153. (b) 154. (a) 155. (d) 156. (a) 157. (c) 158. (d) 159. (b) 160. (b)  
161. (a) 162. (b) 163. (b) 164. (b) 165. (d) 166. (c) 167. (b) 168. (b) 169. (d) 170. (d)  
171. (c) 172. (a) 173. (b) 174. (d) 175. (b) 176. (b) 177. (b) 178. (c) 179. (a) 180. (b)  
181. (a) 182. (b) 183. (d) 184. (a) 185. (b) 186. (b) 187. (c) 188. (c) 189. (b) 190. (b)  
191. (c) 192. (c) 193. (d) 194. (c) 195. (d) 196. (c) 197. (d) 198. (c) 199. (b) 200. (b)  
201. (b) 202. (b) 203. (b) 204. (d) 205. (a) 206. (c) 207. (b) 208. (d) 209. (b) 210. (d)

*Assertion and Reason Questions*

211. (d) 212. (a) 213. (a) 214. (a) 215. (b) 216. (a) 217. (a) 218. (d) 219. (a) 220. (a)  
221. (b) 222. (b) 223. (c) 224. (a) 225. (a) 226. (a) 227. (a) 228. (a) 229. (a)

*Previous Year Questions*

1. (c) 2. (a) 3. (c) 4. (b) 5. (b) 6. (d) 7. (d) 8. (d) 9. (d) 10. (c)  
11. (a) 12. (d) 13. (c) 14. (b) 15. (a) 16. (a) 17. (b) 18. (c) 19. (a) 20. (d)  
21. (c) 22. (a) 23. (d) 24. (d) 25. (d) 26. (b) 27. (a) 28. (a) 29. (a) 30. (a)  
31. (c) 32. (c) 33. (c) 34. (c) 35. (a) 36. (b) 37. (a) 38. (a) 39. (b) 40. (c)  
41. (d) 42. (d) 43. (a) 44. (d)

*NCERT Exemplar Questions*

1. (c) 2. (a) 3. (d) 4. (d) 5. (d) 6. (b) 7. (a) 8. (c) 9. (b) 10. (c)  
11. (b) 12. (c) 13. (a) 14. (c) 15. (d) 16. (b) 17. (a) 18. (c) 19. (c) 20. (c)  
21. (c) 22. (d) 23. (c)

*This page is intentionally left blank.*

# Strategies for Enhancement in Food Production

## PRACTICE QUESTIONS

### Animal Husbandry

- Which of the following techniques/processes are used to enhance food production?
  - Embryo transfer technology
  - Tissue culture technology
  - Animal husbandry and plant breeding
  - All of these
- Find out the incorrect statement.
  - Animal husbandry is the agricultural practice of breeding and raising livestock.
  - More than 70 per cent of the world's livestock population is in India and China.
  - Dairying is the management of animals for milk and its products for human consumption.
  - Hissardale is a new breed of sheep developed in Punjab by crossing Bikaneri rams and Merino ewes.
- Animal husbandry deals with the care and breeding of livestock like
  - Buffaloes and cows
  - Pig and horses
  - Sheep, camel and goat
  - All of these
- Fisheries include rearing, catching and selling of which of the following organisms?
  - Fish
  - Molluscs (shell-fish)
  - Crustaceans (prawn, crab)
  - All of these
- In dairy farm management, we deal with processes and systems that are responsible for
  - Increase in yield of milk
  - Improvement in quality of milk
  - Both (a) and (b)
  - None of these
- Good breeds should have
  - High yielding potential under climatic conditions of the area
  - Resistance to disease
  - Improved quality of the yield
  - All of these
- For realizing good yielding potential which of the following are required?
  - Animal should be housed well and provided with adequate water.
  - Maintain disease-free animals.
  - Feeding should be in scientific manner along with good quality and quantity of fodder.
  - All the above

8. The word 'poultry' is used to refer the meat of  
 (a) Chicken and ducks (b) Turkey  
 (c) Geese (d) All of these
9. How can we prevent the spreading of the flu in case when some chicken are infected in poultry form?  
 (a) Select these chickens  
 (b) Kill selected chicken and burn them  
 (c) Kill selected chickens and bury them deep inside earth  
 (d) All the above

10.



(a)



(b)



(c)

- (a) A-Improved breed of cattle—Jersey (b) B-Improved breed of chickens—Leghorn  
 (c) C-Sterile—Mule (d) All are correct
11. The term 'breed' means  
 (a) A group of animals related by descent and similar in most of the characters like general appearance, feature, size and configurations.  
 (b) A group of animals which depend on each other.  
 (c) A group of animals living in a same habitat.  
 (d) A group of animals which can't reproduce with each other.
12. Select the incorrect combination.  
 (a) Class of domesticated fowl (birds) used for food and eggs—Poultry  
 (b) Breeding between animals of the same breed—Inbreeding  
 (c) Breeding between different breeds—Outbreeding  
 (d) Keeping honeybees for the production of honey—Pisciculture
13. Bee-keeping is known as  
 (a) Pisciculture (b) Silviculture  
 (c) Apiculture (d) Aquaculture
14. The following are freshwater fishes except  
 (a) Catla (b) Rohu  
 (c) Common carp (d) Mackerel
15. The following are marine water fishers except  
 (a) Hilsa (b) Sardines  
 (c) Pomfrets (d) Rohu
16. Which of the following points are important for successful bee-keeping?  
 (a) Knowledge of nature and habits of bees  
 (b) Catching and hiving of swarms (group of bees)  
 (c) Management of beehives during different seasons  
 (d) All the above

17. Keeping beehives in crop fields during flowering period causes  
(a) Increased pollination efficiency (b) Increasing yield of crop  
(c) Increasing yield of honey (d) All of these
18. Example of interspecific hybridization  
(a) Hissardale (b) Mule  
(c) Jersey (d) Leghorn
19. In MOET \_\_\_\_\_ cell stage, the fertilized egg are recovered non-surgically and transferred to surrogate mothers.  
(a) 8–32 (b) 2–4  
(c) 6–8 (d) 4–6
20. Hissardale is a new breed of sheep developed in Punjab by crossing  
(a) Bikaneri ewes and Merino rams (b) Dolly and Merino rams  
(c) Ajmeri ewes and Merino rams (d) Jersey and Bikaneri ewes
21. Mule is produced by cross-breeding  
(a) Male horse and female horse (b) Male donkey and female horse  
(c) Female donkey and male horse (d) Male donkey and female donkey

### **Plant Breeding**

22. Green revolution was dependent to a large extent on plant breeding techniques for the development of high yielding and disease resistant varieties in  
(a) Wheat (b) Maize (c) Rice (d) All of these
23. Which of the following is the most important character or trait that the breeders have tried to incorporate in plants first?  
(a) Resistance to pathogens (virus, fungi and bacteria)  
(b) Increase tolerance to insect pest  
(c) Increased tolerance to environmental stress  
(d) Increased crop yield
24. The entire collection (of plants/seeds) having all the diverse allele for all genes in a given crop is called  
(a) Gene bank (b) Tissue culture  
(c) Genetic engineering (d) Germplasm collection
25. Which process of plant breeding technique is the most time-consuming and tedious?  
(a) Collection of variability  
(b) Cross hybridization among the selected parents  
(c) Evaluation and selection of parents  
(d) Selection and testing of superior recombinants
26. Self-pollination for several generations create  
(a) Heterozygosity (b) Homozygosity (c) Hemizygosity (d) Aneuploidy
27. Which is not a step in breeding a new genetic variety of crop?  
(a) Collection of variability  
(b) Evaluation and selection of parent  
(c) Self-hybridization among the selected parents  
(d) Selection and testing of superior recombinants

28. Testing, release and commercialization of new cultivar include  
 (a) Evaluation in research field.  
 (b) Recoding performance of cultivar under ideal fertilizer application, irrigation and crop management practice.  
 (c) Evaluation in farmer's field for at least three growing seasons at several locations in a country.  
 (d) All the above
29. In India agriculture accounts for approx \_\_\_\_\_ % of India's GDP and employs nearly \_\_\_\_\_ % of the population.  
 (a) 33, 62 (b) 62, 33 (c) 50, 50 (d) 60, 40
30. P1542 is a hybrid variety of  
 (a) Maize (b) Wheat (c) Rice (d) Garden pea
31. Which of the following plant hybrids are successfully developed in India?  
 (a) Maize (b) Jowar (c) Bajara (d) All of these
32. The development of several high yielding varieties of wheat and rice in the mid \_\_\_\_\_ through plant breeding techniques lead to the Green Revolution in India.  
 (a) 1950s (b) 1960s (c) 1970s (d) 1980s
33. In 1963 several variety of wheat such as \_\_\_\_\_ and \_\_\_\_\_, which were high yielding and disease resistance, were introduced all over the wheat growing belt of India.  
 (a) Sonalika, Kalyan sona (b) Sonalika, IR – 8  
 (c) Sonalika, Taichung Native-I (d) Kalyan sona, Jaya
34. Semi-dwarf varieties of rice developed in India are  
 (a) Sonalika and Kalyan sona (b) IR–8 and Taichung Native–I  
 (c) Jaya and Ratna (d) Altas 66 and Himgiri
35. Semi-dwarf varieties of rice were derived from  
 (a) Sonalika and Kalyan sona (b) IR – 8 and Taichung Native–I  
 (c) Jaya and Ratna (d) Altas 66 and Himgiri
36. Taichung Native I variety of rice were from which country?  
 (a) India (b) Philippines (c) Taiwan (d) Japan
37. All of the given options are true about *Saccharum barberi* except  
 (a) Grown in North India (b) Poor yield  
 (c) Poor sugar content (d) High sugar content
38. All of the given options are true about *Saccharum officinarum* except  
 (a) Grown in South India (b) Thicker stem  
 (c) High sugar content (d) Grow well in North India
39. Match the column-I (Plant) with Column-II (Variety)

| Column-I      | Column-II                   |
|---------------|-----------------------------|
| 1. Wheat      | A. Altas – 66               |
| 2. Sugar cane | B. <i>Saccharum barberi</i> |
| 3. Okra       | C. Pusa A – 4               |
| 4. Chilli     | D. Pusa Vadabahaar          |
| 5. Rice       | E. Jaya                     |

- (a) 1-A, 2-B, 3-C, 4-D, 5-E  
(b) 1-B, 2-D, 3-A, 4-E, 5-C  
(c) 1-D, 2-A, 3-E, 4-C, 5-B  
(d) 1-C, 2-E, 3-B, 4-A, 5-D
40. Select the incorrect match.  
(a) SCP—Single Cell Protein  
(b) IRRI—International Rice Research Institute  
(c) MOET—Multiple Ovulation Embryo Transfer Technology  
(d) IUCN—International Union for Conservation of Nation
41. Select the correct match.  
(a) Plant breeding—Purposeful manipulation of plant species in order to create desired plant types that are better suited for cultivation gives better yield and are disease resistance.  
(b) Gene bank—The entire collection of plant/seeds having all the diverse alleles for all genes in a given crop.  
(c) Fishery—Industry devoted to the catching, processing or selling of fish only.  
(d) MOET—It is used for herd improvement. In this method, a cow is administered hormones, with LH-like activity, which lead to super-ovulation (i.e., produce 6 – 8 eggs/cycle).
42. Which combination of qualities is first priority of plant breeder?  
(A) Increased yield  
(B) Increased quality of food  
(C) Increased resistance to pathogens  
(D) Increased tolerance to environmental stresses  
(a) A and B only  
(b) C and D only  
(c) All A, B, C, D  
(d) A, B, and C only
43. Fill in the blanks Column-I (Crop), Column-II (Variety), Column-III (Resistance to disease).
- | Column-I | Column-II  | Column-III                                              |
|----------|------------|---------------------------------------------------------|
| Wheat    | <b>A</b>   | Lear and strip rust                                     |
| Brassica | <b>B</b>   | <b>C</b>                                                |
| Cowpea   | Pusa komal | <b>D</b>                                                |
| Chilli   | <b>E</b>   | Chilli mosaic virus, Tobacco mosaic virus and leaf curl |
- (a) A-Karan rai, B-Himgiri, C-Bacterial blight, D-White rust, E-Pusa swarnim  
(b) A-Himgiri, B-Karan rai, C-White rust, D-Bacterial blight, E-Pusa sadabahar  
(c) A-Pusa sadabahar, B-Himgiri, C-White rust, D-Pusa swarnim, E-White rust  
(d) A-Bacterial blight, B-White rust, C-Karan rai, D-Himgiri, E-Pusa sadabahar
44. The following are varieties of Wheat except  
(a) Altas-66  
(b) Himgiri  
(c) I R-8  
(d) Sonalika
45. Which of the following is/are variety/varieties of cauliflower?  
(a) Pusa shubhra  
(b) Pusa komal  
(c) Pusa snowball K-1  
(d) Both (a) and (c)
46. In which plant, resistance to yellow mosaic virus and powdery mildew were induced by mutations?  
(a) Flat bean  
(b) A. esculentus  
(c) Mung bean  
(d) Pusa A-4



47. Resistance to \_\_\_\_\_ in bhindi was transferred from a wild species and resulted in a new variety of *A. esculentus* called \_\_\_\_\_.
- (a) Yellow mosaic virus, pusa gaurav (b) Chilly mosaic virus, pusa sadabahar  
(c) Yellow mosaic virus, parbhani Kranti (d) Whist rust, pusa swarnim
48. Find out the incorrect statement.
- (a) Conventional breeding is often constrained by the availability of limited number of disease resistance genes.  
(b) Transfer of resistance gene is achieved by sexual hybridization between the target and source plant.  
(c) Inducing mutations in plant through various means and then screening the plant materials for resistance sometimes leads to desirable genes being identified.  
(d) It is not possible to induce mutations artificially through use of chemicals or radiation like gamma radiation.
49. Maize offers resistance to maize stem borers by
- (a) High aspartic acid (b) Low nitrogen content  
(c) Low sugar content (d) All of these
50. Match column-I (Plant Part) with Column-II (Insect Resistance).

| Column-I                       | Column-II                                    |
|--------------------------------|----------------------------------------------|
| 1. Hairy leaves                | A. Resistance to jassids in cotton           |
| 2. Solid stem                  | B. Resistance to Cereal leaf beetle in wheat |
| 3. Smooth leaf and less nectar | C. Resistance to Stem sawfly in wheat        |
|                                | D. Resistance to Bollworm in cotton          |

- (a) 1-A, 2-B and C, 3-D (b) 1-A and B, 2-C, 3-D  
(c) 1-D, 2-C, 3-A and B (d) 1-A and C, 2-B, 3-C
51. How many of the given names are various types of Brassica?  
*Pusa komal, Pusa sem 2, Pusa sem 3, Pusa gaurav, Pusa swarnim, Pusa sawami, Pusa shubhra*
- (a) 1 (b) 2 (c) 3 (d) 4
52. Fill in the blanks.

| Column-I<br>Crop               | Column-II<br>Variety      | Column-III<br>Insect Pests |
|--------------------------------|---------------------------|----------------------------|
| Brassica<br>(rapeseed mustard) | A                         | Aphids                     |
| Flat bean                      | Pusa sem 2,<br>Pusa sem 3 | B, Aphids and fruit borer  |
| D                              | Pusa sawani<br>Pusa A-4   | C                          |

- (a) A-Pusa swarnim, B-Shoot borer, C-Jassids, D-Okra  
(b) A-Pusa gaurav, B-Jassids, C-Shoot and fruit borer, D-Okra  
(c) A-Okra, B-Jassids, C-Fruit borer, D-Pusa komal  
(d) A-Himgiri, B-Jassids, C-Shoot and fruit borer, D-Okra

53. The source of pest resistance gene may be  
 (a) Cultivated varieties (b) Germplasm collection of the crop  
 (c) Wild relatives (d) All of these
54. Which brassica variety is resistant to white rust?  
 (a) Pusa sawani (b) Pusa komal  
 (c) Pusa swarnim (d) Pusa sadabahar
55. Which of the following pair are varieties of okra (*A. esculentus*)?  
 (a) Pusa sem 2 and Pusa sem 3 (b) Pusa shubhra and Pusa snowball K – I  
 (c) Pusa sawani and Pusa A–4 (d) Pusa swarnim and Pusa gaurav
56. Which of the following pair are varieties of cauliflower?  
 (a) Pusa sem 2 and Pusa sem 3 (b) Pusa shubhra and Pusa snowball K – I  
 (c) Pusa sawani and Pusa A – 4 (d) Pusa swarnim and Pusa gaurav
57. Match the Column-I (Causative agent) with Column-II (Disease).

| Column-I    | Column-II                |
|-------------|--------------------------|
| 1. Virus    | A. Brown rust of wheat   |
| 2. Bacteria | B. Red rot of sugar cane |
| 3. Fungi    | C. Late blight of potato |
|             | D. Black rot of crucifer |
|             | E. Tobacco mosaic        |
|             | F. Turnip mosaic         |

- (a) 1-E, F ; 2-D; 3-A, B, C (b) 1-E; 2-D, F; 3-A, B, C  
 (c) 1-A, B, C; 2-D, E; 3-F (d) 1-A, B; 2-C, D; 3-E, F
58. The sequential steps for breeding are  
 (A) Screening germplasm for resistance sources  
 (B) Selection and evaluation of hybrid  
 (C) Hybridization of selected parents  
 (D) Testing and release of new varieties  
 (a) D, C, B, A (b) A, B, C, D  
 (c) A, C, B, D (d) A, C, D, B
59. Breeding for improved nutritional quality is undertaken with the objective of improving all of these except  
 (a) Protein content and quality (b) Oil content and quality  
 (c) Vitamin micronutrient and mineral content (d) Senescence of plant
60. In 2000 a new maize hybrid was developed, which was rich in the following amino acids?  
 (a) Lysine and glycine (b) Tryptophan and glutamic acid  
 (c) Lysine and tryptophan (d) Glycine and glutamic acid
61. From the following, how many are varieties of wheat?  
*Atlas 66, Himgiri, Sonalika, Kalyan sona, Jaya, Ratna*  
 (a) 3 (b) 2  
 (c) 4 (d) 5

62. Iron fortified rice variety is \_\_\_\_\_ times richer in iron than the commonly used varieties.  
 (a) 2 (b) 3 (c) 4 (d) 5
63. Wheat variety Atlas 66 is rich in  
 (a) Lipid content (b) Water content  
 (c) Protein content (d) Mineral content
64. IARI, New Delhi released several vegetable crops that are rich in vitamins and minerals. With respect to that select the correct match.

| Column-I     | Column-II                                    |
|--------------|----------------------------------------------|
| 1. Vitamin A | A. Correct, spinach, pumpkin                 |
| 2. Vitamin C | B. Bitter gourd, bathua, mustard, tomato     |
| 3. Fe and Ca | C. Spinach and bathua                        |
| 4. Protein   | D. road bean, lablab, French and garden peas |

- (a) A-2, B-3, C-1, D-4 (b) A-1, B-2, C-3, D-4  
 (c) A-4, B-1, C-2, D-3 (d) A-3, B-4, C-1, D-2
65. Diet deficiency in essential micro nutrients like Iron, Vitamin A, iodine and Zinc is responsible for  
 (a) Increased risk of disease (b) Reduced life span  
 (c) Reduced mental abilities (d) All of these
66. Select the wrong combination.  
 (a) SCP–Single Cell Protein  
 (b) IRRI–International Rice Research Institute  
 (c) MOET–Multiple Ovulation Embryo Transfer Technology  
 (d) IARI–Indian Agro Revolution Institute
67. \_\_\_\_\_ kg of grains produces \_\_\_\_\_ kg of meat by animal farming.  
 (a) 3–10, 2 (b) 3–10, 10 (c) 3–10, 1 (d) 3–10, 5
68. What percentage of human population is suffering from hunger?  
 (a) >25% (b) >70% (c) >80% (d) >90%
69. Which has high rate of biomass production?  
 (a) Cow (b) Buffalo  
 (c) Methylophilus methylotrophus (d) Pavo cristatus
70. Spirulina can be grown easily on  
 (a) Waste water from potato processing plant (b) Straw and molasses  
 (c) Animal manure and sewage (d) All of these
71. \_\_\_\_\_ of a microorganism like Methylophilus methylotrophus, because of its high rate of biomass production and growth, can be expected to produce \_\_\_\_\_ of protein.  
 (a) 250 gm, 25 tonnes (b) 50 gm, 25 tonnes  
 (c) 20 gm, 25 kg (d) 25 gm, 250 gm
72. Which of the following organism can be used as food  
 (a) Mushroom (b) Spirulina  
 (c) Chlorella (d) All of these

73. One of the alternate sources of proteins for animal and human nutrition is  
(a) ROP (b) SCP (c) GIP (d) BCG
74. The shift from grain to meat diet creates more demand for cereals as it takes \_\_\_\_\_ kg of grain to produce \_\_\_\_\_ kg of meat by animal farming.  
(a) 1, 1 (b) 2, 2 (c) 3–10, 1 (d) 1, 3–10

### Tissue Culture

75. In tissue culture, any part of a plant is taken out and grown in a test tube under sterile conditions in a special nutrient medium to regenerate whole plant. The part of plant used for this purpose is known as  
(a) Somaclone (b) Embryo (c) Explant (d) Zygote
76. The capacity to regenerate whole plant from plant cell or explant is known as  
(a) Totipotency (b) Pluripotency  
(c) Metaplasia (d) Atrophy
77. The method of producing thousands of plants through tissue culture is called  
(a) Explant (b) Totipotency  
(c) Somaclone (d) Micro-propagation
78. Which of the following plants have been produced by tissue culture method on commercial scale?  
(a) Tomato (b) Banana (c) Apple (d) All of these
79. The scientists have succeeded in culturing meristems of which of the following plants?  
(a) Banana (b) Sugarcane (c) Potato (d) All of these
80. The part of virus infected plant used for tissue culture, free from viruses is  
(a) Flower (b) Leaf  
(c) Apical meristem (d) All of these
81. Protoplast from two different varieties of plants, each having a desirable character, can be fused by a process known as  
(a) Somatic hybridization (b) Monohybrid cross  
(c) Tissue culture (d) Embryo culture
82. Tomato and potato protoplast is fused to form  
(a) Topoto (b) Pomato (c) Totato (d) Tomapo
83. Find out the incorrect statement.  
(a) Virus free plant can be obtained by meristem culture.  
(b) In micro-propagation soma clones are produced.  
(c) Plant cell without cell wall is known as protoplast.  
(d) Pomato (Somatic hybrid) has all the desired combinations of characteristics for its commercial utilization.
84. In tissue culture, the nutrient medium should contain  
(a) Carbon source, eg., Sucrose  
(b) Inorganic salt, vitamin and amino acid  
(c) Growth regulators like auxins and cytokinins  
(d) All the above

85. Find out the total number of marine fishes from the following.  
*Hilsa, Sardines, Mackerel, Pomfrets, Catla, Rohu, Common carp*  
(a) 4 (b) 5 (c) 6 (d) 7
86. Which of the following are types of outbreeding?  
(a) Out-crossing (b) Cross breeding  
(c) Interspecific hybridization (d) All of these
87. Match the columns.
- | Column-I            | Column-II                      |
|---------------------|--------------------------------|
| A. White revolution | 1. Increase in milk production |
| B. Green revolution | 2. Increase in crop production |
| C. Blue revolution  | 3. Increase in fish production |
- (a) A-1, B-2, C-3 (b) A-2, B-3, C-1  
(c) A-3, B-2, C-1 (d) A-1, B-3, C-2
88. Aquaculture means  
(a) Production of aquatic animals (b) Production of aquatic plant  
(c) Both (a) and (b) (d) None of these
89. Interspecific hybridization means  
(a) Mating of animals within the same breed.  
(b) Superior male of one breed mated with superior female of another breed.  
(c) Male and female animals of two different related species are mated.  
(d) All the above
90. Which of the following statements are true?  
(a) Bee wax is a by-product of honey  
(b) Honeybees are potent pollinators  
(c) Honey is a food of high nutritional value  
(d) All the above
91. Which of the following is a variety of rice?  
(a) Atlas-66 (b) Himgiri (c) Sonalika (d) Ratna
92. Which of the following diseases is caused by bacteria?  
(a) Red rot of sugarcane (b) Powdery mildew  
(c) Black rot of crucifer (d) Late blight of potato
93. In biofortification the objective is to improve the quality as well as content of  
(a) Micronutrient (b) Vitamin (c) Oil (d) All of these
94. Objectives of animal breeding are  
(a) Increasing the quantity of yield (b) Improving the quality of the product  
(c) Resistance to various diseases (d) All of these
95. The father of Green Revolution is  
(a) Norman E. Borlaug (b) Panchanan Maheshwari  
(c) Dr Verghese Kurien (d) M. S. Swaminathan

96. Which of the following are the advantages of SCP?
- (a) Rich in high quality protein and poor in fat content.
  - (b) Production is based on industrial effluents so it helps to minimize the environmental pollution.
  - (c) It can be produced in laboratories throughout the year.
  - (d) All the above
97. Disease resistance in plants can be induced by
- (a) Mutation
  - (b) Proper manuring
  - (c) Breeding with wild relatives
  - (d) Early sowing
98. Variations in plants produced by tissue culture is known as
- (a) Androgenic variation
  - (b) Somaclonal variation
  - (c) Cybridization
  - (d) Induced variation
99. Green revolution has been possible due to the development of high yielding variety of
- (a) Wheat and rice
  - (b) Apples and pears
  - (c) Jowar and bajra
  - (d) Sugarcane and grams
100. Somatic hybridization is a technique of
- (a) Natural breeding
  - (b) Natural pollination
  - (c) Artificial pollination
  - (d) Somatic cell hybridization
101. Somaclonal variations appear in plants
- (a) Growing in polluted soil or water
  - (b) Exposed to gamma rays
  - (c) Raised in tissue culture
  - (d) Transformed by recombinant DNA technology
102. In crop improvement programme, virus free clones can be obtained through
- (a) Embryo culture
  - (b) Shoot apex culture
  - (c) Grafting
  - (d) Hybridization
103. Pollen grains of a plant, where  $2n = 28$  are cultured to get callus by tissue culture method. What would be the number of chromosomes in the cells of the callus?
- (a) 14
  - (b) 56
  - (c) 28
  - (d) 21
104. By which of the following methods, new and better varieties of plants can be formed?
- (a) Selection
  - (b) Grafting
  - (c) Hybridization
  - (d) Hybridization followed by selection

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

- 105. Assertion:** Inbreeding increases heterozygosity.  
**Reason:** Continuous inbreeding usually enhances fertility and even productivity.
- 106. Assertion:** Mule is an example of interspecific hybrid.  
**Reason:** Mule produced by cross between male donkey and female horse.
- 107. Assertion:** Mung beans are resistant to yellow mosaic virus.  
**Reason:** Resistance is induced by mutation.
- 108. Assertion:** Shoot-tip culture is used to raise virus-free clones.  
**Reason:** Other explants can equally give rise to virus-free clones.
- 109. Assertion:** Somatic hybridization is the fusion of protoplasts of two different varieties of plants.  
**Reason:** Somatic hybridization is a type of sexual reproduction.
- 110. Assertion:** Hisardale is a new breed of sheep.  
**Reason:** Developed by crossing between Merino ewes and Bikaneri rams.
- 111. Assertion:** Multiplication of plants in *in vitro* condition from the explants is called micropropagation.  
**Reason:** Micropropagation occurs either in the form of multiple shoot formation or somatic embryos.
- 112. Assertion:** Hairy leaves in several plants are associated with resistance to insect pests.  
**Reason:** Nectarless cotton varieties do not attract bollworms.
- 113. Assertion:** Beeswax is an animal product produced by honeybee.  
**Reason:** Honey contains only sugar, nothing else.
- 114. Assertion:** Cattle breeds can be improved by superovulation and embryo transplantation.  
**Reason:** Superovulation in high milk-yielding cows is induced by hormonal injection.
- 115. Assertion:** Pomato is not available commercially.  
**Reason:** Pomato did not have all the desired combination of characteristics for its commercial utilization.
- 116. Assertion:** Atlas 66 is used as a donor for improving cultivated wheat.  
**Reason:** Atlas 66 is protein rich wheat variety.
- 117. Assertion:** Some maize varieties are resistant to maize stem borer.  
**Reason:** They contain high aspartic acid, low nitrogen and low sugar content.
- 118. Assertion:** Some cotton varieties do not attract bollworms.  
**Reason:** These cotton varieties are nectarless and possess smooth leaves.
- 119. Assertion:** Wild relatives of several plants are useful to us.  
**Reason:** Wild relative possesses certain resistant characters which are useful in plant breeding.
- 120. Assertion:** Fishery is an industry devoted to the catching, processing or selling of fish, shellfish or other aquatic animals.  
**Reason:** A large number of our population depends on fish and fish products and some other aquatic animals.
- 121. Assertion:** Artificial insemination is a technique used in controlled breeding experiments.  
**Reason:** Artificial insemination helps us to overcome several problems of normal mating.

122. **Assertion:** In MOET cow is administered with hormone with FSH like activity.  
**Reason:** It causes super ovulation in administered cow.
123. **Assertion:** Poultry is useful to us.  
**Reason:** Poultry is the class of domesticated fowl used for food or for their eggs.

---

**PREVIOUS YEAR QUESTIONS**

---

1. Black (stem) rust of wheat is caused by [AIPMT MAINS 2010]  
(a) *Alternaria solani* (b) *Ustilago nuda*  
(c) *Puccinia graminis* (d) *Xanthomonas oryzae*
2. Breeding of crops with high levels of minerals, vitamins and proteins is called [AIPMT 2010 PRE]  
(a) Somatic hybridization (b) Biofortification  
(c) Biomagnification (d) Micropropagation
3. An improved variety of transgenic basmati rice [AIPMT PRE 2010]  
(a) Does not require chemical fertilizers and growth hormones.  
(b) Gives high yield and is rich in vitamin-A.  
(c) Is completely resistant to all insect pests and diseases of paddy.  
(d) Gives high yield but has no characteristic aroma.
4. 'Jaya' and 'Ratna' developed for green revolution in India are the varieties of [AIPMT PRE 2011]  
(a) Rice (b) Wheat  
(c) Bajra (d) Maize
5. 'Himgiri' developed by hybridization and the selection for disease resistance against rust pathogens is a variety of [AIPMT PRE 2011]  
(a) Maize (b) Sugarcane  
(c) Wheat (d) Chilli
6. Consider the following statements (A to D) about organic farming:  
(A) Utilizes genetically modified crops like Bt cotton.  
(B) Uses only naturally produced inputs like compost.  
(C) Does not use pesticides and urea.  
(D) Produces vegetables rich in vitamins and minerals. [AIPMT MAINS 2011]  
(a) B, C, and D (b) C and D only  
(c) B and C only (d) A and B only
7. Consider the following four statements (a to d) and select the option which includes all the correct ones only:





15. To obtain virus-free healthy plants from a diseased one by tissue culture technique, which part/parts of the diseased plant will be taken? [AIPMT 2014]
- (a) Apical meristem only
  - (b) Palisade parenchyma
  - (c) Both apical and axillary meristems
  - (d) Epidermis only
16. A technique of micro propagation is [AIPMT 2015]
- (a) Somatic hybridization
  - (b) Somatic embryogenesis
  - (c) Protoplast fusion
  - (d) Embryo rescue
17. Golden rice is a genetically modified crop plant where the incorporated gene is meant for biosynthesis of: [RE-AIPMT 2015]
- (a) Vitamin C
  - (b) Omega 3
  - (c) Vitamin A
  - (d) Vitamin B
18. Outbreeding is an important strategy of animal husbandry because it: [RE-AIPMT 2015]
- (a) Is useful in producing purelines of animals
  - (b) Is useful in overcoming inbreeding depression
  - (c) Exposes harmful recessive genes that re eliminated by selection
  - (d) Helps in accumulation of superior genes
19. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called: [NEET - I, 2016]
- (a) Ley farming
  - (b) Contour farming
  - (c) Strip farming
  - (d) Shifting agriculture
20. You are given a tissue with its potential for differentiation in an artificial culture. Which of the following pairs of hormones would you add to the medium to secure shoots as well as roots? [NEET - II, 2016]
- (a) Auxin and cytokinin
  - (b) Auxin and abscisic acid
  - (c) Gibberellin and abscisic acid
  - (d) IAA and gibberrellin
21. Interspecific hybridization is the mating of [NEET - II, 2016]
- (a) Two different related species
  - (b) Superior males and females of different breeds
  - (c) More closely related individuals within same breed for 4 – 6 generations
  - (d) Animals within same breed without having common ancestors
22. Among the following edible fishes, which one is a marine fish having rich source of omega-3 fatty acids? [NEET - II, 2016]
- (a) Mangur
  - (b) Mrigala
  - (c) Mackerel
  - (d) Mystus

## NCERT EXEMPLAR QUESTIONS

- The chances of contracting bird flu from a properly cooked (above 100°C) chicken and egg are  
(a) Very high (b) High (c) Moderate (d) None
- A group of animals which are related by descent and share many similarities are referred to as  
(a) Breed (b) Race (c) Variety (d) Species
- Inbreeding is carried out in animal husbandry because it  
(a) Increases vigour (b) Improves the breed  
(c) Increases heterozygosity (d) Increases homozygosity
- Sonalika and Kalyan Sona are the varieties of  
(a) Wheat (b) Rice (c) Millet (d) Tobacco
- Which one of the following is not a fungal disease?  
(a) Rust of wheat (b) Smut of Bajra  
(c) Black rot of crucifers (d) Red rot of sugarcane
- In virus infected plants the meristematic tissues in both apical and axillary buds are free of virus because  
(a) The dividing cells are virus resistant.  
(b) Meristems have antiviral compounds.  
(c) The cell division of meristems are faster than the rate of viral multiplication.  
(d) Viruses cannot multiply within meristem cell(s).
- Several South Indian states raise 2 to 3 crops of rice annually. The agronomic feature that makes this possible is because of  
(a) Shorter rice plant (b) Better irrigation facilities  
(c) Early yielding rice variety (d) Disease resistant rice variety
- Which one of the following combination would a sugarcane farmer look for in the sugarcane crop?  
(a) Thick stem, long internodes, high sugar content and disease resistance.  
(b) Thick stem, high sugar content and profuse flowering.  
(c) Thick stem, short internodes, high sugar content, disease resistance.  
(d) Thick stem, low sugar content, disease resistance.
- Fungicides and antibiotics are chemicals that  
(a) Enhance yield and disease resistance.  
(b) Kill pathogenic fungi and bacteria, respectively.  
(c) Kill all pathogenic microbes.  
(d) Kill pathogenic bacteria and fungi respectively.
- Use of certain chemicals and radiation to change the base sequences of genes of crop plants is termed as  
(a) Recombinant DNA technology  
(b) Transgenic mechanism  
(c) Mutation breeding  
(d) Gene therapy

11. The scientific process by which crop plants are enriched with certain desirable nutrients is called
- (a) Crop protection (b) Breeding  
(c) Bio-fortification (d) Bio-remediation
12. The term 'totipotency' refers to the capacity of a
- (a) Cell to generate whole plant (b) Bud to generate whole plant  
(c) Seed to germinate (d) Cell to enlarge in size
13. Given below are a few statements regarding somatic hybridization. Choose the correct statements.
- (i) Protoplasts of different cells of the same plant are fused.  
(ii) Protoplasts from cells of different species can be fused.  
(iii) Treatment of cells with cellulase and pectinase is mandatory.  
(iv) The hybrid protoplast contains characters of only one parental protoplast.
- (a) (i) and (iii) (b) (i) and (ii) (c) (i) and (iv) (d) (ii) and (iii)
14. An explant is
- (a) Dead plant  
(b) Part of the plant  
(c) Part of the plant used in tissue culture  
(d) Part of the plant that expresses a specific gene.
15. The biggest constraint of plant breeding is
- (a) Availability of desirable gene in the crop and its wild relatives  
(b) Infrastructure  
(c) Trained manpower  
(d) Transfer of genes from unrelated sources
16. Lysine and tryptophan are
- (a) Proteins (b) Non-essential amino acids  
(c) Essential amino acids (d) Aromatic amino acids
17. Micro-propagation is
- (a) Propagation of microbes *in vitro* (b) Propagation of plants *in vitro*  
(c) Propagation of cells *in vitro* (d) Growing plants on smaller scale
18. Protoplast is
- (a) Another name for protoplasm (b) An animal cell  
(c) A plant cell without a cell wall (d) A plant cell
19. To isolate protoplast, one needs
- (a) Pectinase (b) Cellulase  
(c) Both pectinase and cellulase (d) Chitinase
20. Which one of the following is a marine fish?
- (a) Rohu (b) Hilsa (c) Catla (d) Common Carp
21. Which one of the following products of apiculture is used in cosmetics and polishes?
- (a) Honey (b) Oil (c) Wax (d) Royal jelly
22. More than 70 per cent of livestock population is in
- (a) Denmark (b) India (c) China (d) India and China

23. The agriculture sector of India employs:  
 (a) 60 per cent of the population (b) 70 per cent of the population  
 (c) 30 per cent of the population (d) 62 per cent of the population
24. 33 per cent of India's (Gross Domestic Product) comes from  
 (a) Industry (b) Agriculture  
 (c) Export (d) Small-scale cottage industries.
25. A collection of all the alleles of all the genes of a crop plant is called  
 (a) Germplasm collection (b) Protoplasm collection  
 (c) Herbarium (d) Somaclonal collection

### Answer Keys

#### Practice Questions

1. (d) 2. (d) 3. (d) 4. (d) 5. (c) 6. (d) 7. (d) 8. (d) 9. (d) 10. (d)  
 11. (a) 12. (d) 13. (c) 14. (d) 15. (d) 16. (d) 17. (d) 18. (b) 19. (a) 20. (a)  
 21. (b) 22. (d) 23. (d) 24. (d) 25. (b) 26. (b) 27. (c) 28. (d) 29. (a) 30. (d)  
 31. (d) 32. (b) 33. (a) 34. (c) 35. (b) 36. (c) 37. (d) 38. (d) 39. (a) 40. (d)  
 41. (a) 42. (a) 43. (b) 44. (c) 45. (d) 46. (c) 47. (c) 48. (d) 49. (d) 50. (b)  
 51. (b) 52. (b) 53. (d) 54. (c) 55. (c) 56. (b) 57. (a) 58. (c) 59. (d) 60. (c)  
 61. (c) 62. (d) 63. (c) 64. (b) 65. (d) 66. (d) 67. (c) 68. (a) 69. (c) 70. (d)  
 71. (a) 72. (d) 73. (b) 74. (c) 75. (c) 76. (a) 77. (d) 78. (d) 79. (d) 80. (c)  
 81. (a) 82. (b) 83. (d) 84. (d) 85. (a) 86. (d) 87. (a) 88. (c) 89. (c) 90. (d)  
 91. (d) 92. (c) 93. (c) 94. (d) 95. (a) 96. (d) 97. (c) 98. (b) 99. (a) 100. (d)  
 101. (c) 102. (b) 103. (a) 104. (d)

#### Assertion and Reason Questions

105. (d) 106. (a) 107. (b) 108. (c) 109. (c) 110. (c) 111. (b) 112. (c) 113. (c) 114. (b)  
 115. (a) 116. (a) 117. (a) 118. (a) 119. (a) 120. (a) 121. (a) 122. (a) 123. (a)

#### Previous Year Questions

1. (c) 2. (b) 3. (b) 4. (a) 5. (c) 6. (c) 7. (c) 8. (d) 9. (c) 10. (b)  
 11. (c) 12. (d) 13. (a) 14. (b) 15. (c) 16. (b) 17. (c) 18. (b) 19. (a) 20. (a)  
 21. (a) 22. (c)

#### NCERT Exemplar Questions

1. (d) 2. (a) 3. (d) 4. (a) 5. (c) 6. (c) 7. (c) 8. (a) 9. (b) 10. (c)  
 11. (c) 12. (a) 13. (d) 14. (c) 15. (a) 16. (c) 17. (b) 18. (c) 19. (c) 20. (b)  
 21. (c) 22. (d) 23. (d) 24. (b) 25. (a)

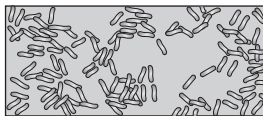
## PRACTICE QUESTIONS

### Microbes in Household Products

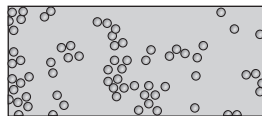
- Choose the correct option with regard to statement A and B.  
 A: Microbes are present everywhere on earth.  
 B: They cannot live in thermal vents where temperature is as high as 100°C.  
 (a) Statement A is correct and B is incorrect    (b) Statements A and B are correct  
 (c) Statement A is incorrect but B is correct    (d) Statements A and B are incorrect
- Prions are \_\_\_\_\_ infectious agents.  
 (a) Lipidic    (b) Sugar containing  
 (c) Proteinaceous    (d) Poison containing
- Microbes after growth on a nutritive medium forms \_\_\_\_\_.  
 (a) Group    (b) Colonies    (c) Species    (d) Family
- \_\_\_\_\_ is/are responsible for converting milk into curd.  
 (a) *Lactobacillus* only    (b) *Lactobacillus* and other microbes  
 (c) Microbes other than *Lactobacillus*    (d) (a) or (c)
- Choose the correct option with regard to statement A and B.  
 A: Lactic Acid Bacteria (LAB) are responsible for converting milk into curd.  
 B: LAB creates acidic medium necessary to coagulate and fully digest the milk proteins.  
 (a) Statements A and B are correct    (b) Statements A and B are incorrect.  
 (c) Statement A is correct but B is incorrect    (d) Statement B is correct and A is incorrect
- If someone wants to make curd from milk, a small amount of curd is added to fresh milk. The small amount of curd containing millions of LAB is known as  
 (a) Accelerator    (b) Promoter    (c) Inoculum    (d) Germ
- To prevent curd from getting sour, which parameter should be essentially controlled?  
 (a) Quantity of milk    (b) Amount of LAB added initially  
 (c) Temperature of the surrounding    (d) Amount of O<sub>2</sub> in surrounding air
- Which vitamin is synthesized by LAB?  
 (a) Vitamin B<sub>2</sub>    (b) Vitamin B<sub>6</sub>    (c) Vitamin B<sub>5</sub>    (d) Vitamin B<sub>12</sub>
- The puffed-up dough of dosa and idli is due to \_\_\_\_\_.  
 (a) Fermentation by bacteria and production of O<sub>2</sub>.  
 (b) Hydrolysis by bacteria and production of CO<sub>2</sub>.  
 (c) Fermentation by bacteria and production of CO<sub>2</sub>.  
 (d) Hydrolysis by bacteria and production of O<sub>2</sub>.

10. Which microbe helps us in the preparation of bread?  
 (a) Bacteria (b) Yeast (c) Fungi (d) Algae
11. Baker's yeast is \_\_\_\_\_.  
 (a) *Saccharomyces cariocanus* (b) *Saccharomyces florentinus*  
 (c) *Saccharomyces cerevisiae* (d) *Saccharomyces spencerorum*
12. \_\_\_\_\_ is a traditional drink of south India.  
 (a) Wine (b) Toddy (c) Tequila (d) Rum
13. The traditional drink of south India is made by fermenting sap from \_\_\_\_\_ tree.  
 (a) Eucalyptus (b) Coconut (c) Palm (d) Date

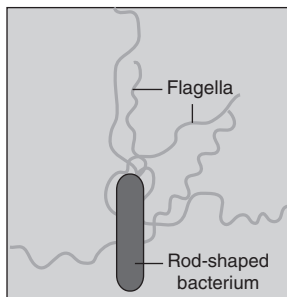
**Figure given for questions 14 and 15.**



(a)



(b)



(c)

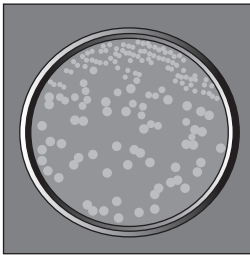
14. The bacteria shown in figure (a) and (b) are at which level of magnification?  
 (a) 150X (b) 1500X  
 (c) 15000X (d) 1.5 lacX
15. The rod shaped bacteria showing flagella is magnified at \_\_\_\_\_.  
 (a)  $5 \times 10^3$  (b)  $5 \times 10^4$   
 (c)  $1.5 \times 10^3$  (d)  $15 \times 10^4$
16. 'Swiss cheese' bears large holes due to the production of  $\text{CO}_2$  by which microbe?  
 (a) *Lactobacillus* (b) *Saccharomyces cerevisiae*  
 (c) *Propionibacterium shermanii* (d) *Aspergillus niger*
17. Just as, Swiss cheese it to bacteria, Roquefort cheese is to \_\_\_\_\_.  
 (a) Algae (b) Yeast (c) Bacteria (d) Fungi
18. Roquefort cheese is ripened by growing a specific fungus on it which gives it a particular \_\_\_\_\_.  
 (a) Texture (b) Large holes  
 (c) Flavour (d) Colour

19. Vessels for growing microbes on industrial scale are known as \_\_\_\_\_.
- (a) Incubators (b) Sterilizers  
(c) Fermenters (d) Microbial vessels
20. Alcoholic beverages are produced by microbial fermentation of
- (a) Malted cereals (b) Fruit juices  
(c) Vegetable juices (d) Both (a) and (b)
21. Brewer's Yeast is
- (a) *Saccharomyces cariocanus* (b) *Saccharomyces florentinus*  
(c) *Saccharomyces cerevisiae* (d) *Saccharomyces spencerorum*
22. \_\_\_\_\_ is the alcoholic beverage obtained without distillation.
- (a) Whiskey (b) Brandy  
(c) Wine (d) Rum
23. Point the odd one out.
- (a) Rum (b) Beer  
(c) Whiskey (d) Brandy
24. 'Antibiotics' literally means
- (a) Protecting life (b) Against life  
(c) Healing life (d) Accelerating life
25. Penicillin was discovered by \_\_\_\_\_.
- (a) Edward Jenner (b) Louis Pasteur  
(c) Alexander Fleming (d) Howard Florey
26. Penicillin was discovered by chance as the organism producing it retarded the growth of \_\_\_\_\_.
- (a) Lactobacilli (b) Staphylococci  
(c) Streptococci (d) E. Coli
27. The name penicillin was given after the mould \_\_\_\_\_.
- (a) *Penicillium notatum* (b) *Penicillium chrysogenum*  
(c) *Penicillium candidum* (d) *Penicillium glaucum*
28. The full potential as an effective antibiotic in the context of penicillin was studied by \_\_\_\_\_.
- (a) Sutton and Boveri (b) Chain and Florey  
(c) Watson and Crick (d) Edward Jenner
29. Penicillin was extensively used during which war?
- (a) World War I (b) World War II  
(c) Both (a) and (b) (d) Cold War
30. \_\_\_\_\_ soldiers were extensively treated with penicillin during World War II.
- (a) German (b) Austrian  
(c) American (d) Japanese
31. 'Gal ghotu' is a common name for which disease?
- (a) Whooping cough (b) Diphtheria  
(c) Plague (d) Leprosy

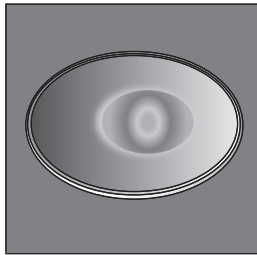


32. 'Kusht rog' is a common name for which disease?  
 (a) Dermatitis (b) Plague  
 (c) Leprosy (d) Whooping cough
33. Citric acid is produced by \_\_\_\_\_.  
 (a) *Aspergillus niger* (b) *Saccharomyces cerevisiae*  
 (c) *Lactobacillus* (d) *Clostridium butylicum*
34. *Acetobacter aceti* essentially produces \_\_\_\_\_.  
 (a) Citric acid (b) Acetic acid  
 (c) Butyric acid (d) Lactic acid
35. Which microbe produces butyric acid?  
 (a) *Sachharomyces cerevisiae* (b) *Clostridium butylicum*  
 (c) *Aspergillus niger* (d) *Propionibacterium shermanii*

**Figures given for questions 36 and 37.**



(a)



(b)

36. What is depicted in figure (a)?  
 (a) Fungal colony (b) Algal colony  
 (c) Bacterial colony (d) Viral colony
37. What is depicted in figure 'b'?  
 (a) Fungal colony (b) Algal colony  
 (c) Bacterial colony (d) Viral colony
38. A bacterium which is a rich source of lactic acid is \_\_\_\_\_.  
 (a) *Lactobacillus* (b) *Aspergillus*  
 (c) *Clostridium* (d) *Saccharomyces*
39. Which enzyme produced by microbes is an important ingredient in detergent formulations?  
 (a) Urease (b) Lipase (c) Pectinase (d) Cleansase
40. The fruit juices available commercially are clearer than ones which are homemade. Which ingredient is added in commercially available fruit juices?  
 (a) Lipase and protease (b) Pectinase and hydrolase  
 (c) Pectinase and protease (d) Hydrolase and protease
41. Which enzyme is known as 'clot-buster'?  
 (a) Protease (b) Thrombokinase  
 (c) Streptokinase (d) Hydrolase

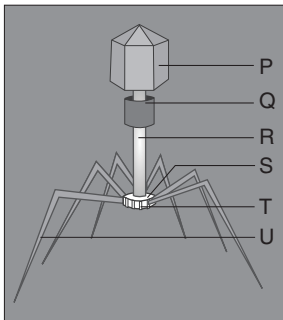
42. 'Clot-buster' is produced by which microbe?  
(a) Staphylococcus (b) Streptococcus  
(c) Penicillium (d) Aspergillus
43. The enzyme streptokinase is used medicinally to  
(a) Check growth of microbes in body fluids  
(b) Remove blood clots from the blood vessels  
(c) Weaken walls of blood vessels  
(d) Create blood clots in blood vessels
44. Which drugs are often administered before and after organ transplant procedure?  
(a) Immunomodulators (b) Immunosuppressants  
(c) Vaccination (d) Anabolic steroids
45. Which drug is generally administered at the time of organ-transplant procedure?  
(a) Actinomycin-D (b) Bleomycin (c) Cyclosporin-A (d) Paclitaxel
46. Cyclosporine-A is produced by fungus \_\_\_\_\_.  
(a) *Trichoderma polysporum* (b) *Penicillium notatum*  
(c) *Micromonospora* (d) *Aspergillus niger*
47. Blood cholesterol lowering agents are known as \_\_\_\_\_.  
(a) Steroids (b) Statins (c) Lipolytics (d) Diuretics
48. *Monascus purpureus* is a commercial source of \_\_\_\_\_.  
(a) Antibiotics (b) Statins (c) Pectinase (d) Ethanol
49. The mechanism of action of statins is \_\_\_\_\_.  
(a) Allosteric inhibition of enzyme is responsible for the synthesis of cholesterol.  
(b) Competitive inhibition of enzyme is responsible for the synthesis of cholesterol.  
(c) Irreversible inhibition of enzyme is responsible for the synthesis of cholesterol.  
(d) None of the above
50. The major portion of waste water in cities and towns is \_\_\_\_\_.  
(a) Household waste (b) Industrial waste  
(c) Human excreta (d) Both (a) and (b)

### Microbes in Sewage Treatment

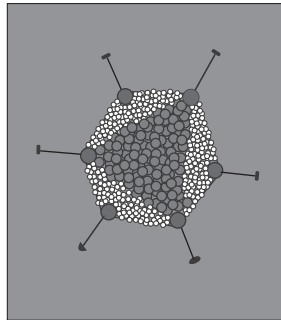
51. Municipal waste water is also known as \_\_\_\_\_.  
(a) Drainage (b) Sewage (c) Spillage (d) Gutter
52. Sewage is treated in \_\_\_\_\_.  
(a) STD (b) STP (c) SPT (d) SDT
53. STP stands for  
(a) Sequential Topographical Projection (b) Standard Test Procedure  
(c) Sewage Treatment Plant (d) None of these
54. Which microbes help in sewage treatment?  
(a) Autotrophic (b) Heterotrophic (c) Symbiotic (d) Saprophytic
55. Sewage water treatment is done in how many stages?  
(a) 1 (b) 3 (c) 2 (d) 4

56. Primary treatment of sewage waste involves which processes?  
 (a) Filtration and incubation  
 (b) Sedimentation and decantation  
 (c) Filtration and sedimentation  
 (d) Sedimentation and microbial proliferation
57. In sewage treatment plant, primary treatment involving removal of floating debris is done by  
 (a) Vacuum filtration  
 (b) Pressure filtration  
 (c) Sequential filtration  
 (d) Sedimentation
58. In primary treatment of sewage water, removal of grit involves which process?  
 (a) Decantation  
 (b) Picking  
 (c) Filtration  
 (d) Sedimentation
59. In primary treatment of sewage water, after sedimentation, the solids that settle form \_\_\_\_\_.  
 (a) Activated sludge  
 (b) Primary sludge  
 (c) Secondary sludge  
 (d) Both (a) and (c)
60. The supernatant left after sedimentation of sewage water during primary treatment is known as  
 (a) Effluent  
 (b) Flocs  
 (c) Sludge  
 (d) Effluent
61. Which of the following is transferred from primary setting tank to another tank for secondary treatment?  
 (a) Grit  
 (b) Sludge  
 (c) Effluent  
 (d) Floc

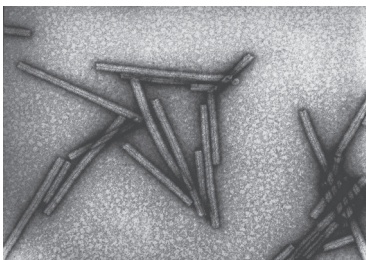
**Figures given for questions 62 – 70.**



(a)



(b)



(c)

62. What does figure (a) depict?  
(a) Adenovirus (b) Rhinovirus  
(c) Bacteriophage (d) Tobacco mosaic virus
63. What does 's' represent in the figure (a)?  
(a) Plate (b) Head (c) Tail (d) Prongs
64. What does 'p' indicate in the figure (a)?  
(a) Plate (b) Head (c) Collar (d) Prongs
65. What does 'r' indicate in the figure (a)?  
(a) Head (b) Collar (c) Tail (d) Plate
66. What does 'u' represent in the figure (a)?  
(a) Prongs (b) Pins (c) Plate (d) Collar
67. What does 'q' indicate in the figure (a)?  
(a) Head (b) Collar (c) Tail (d) Plate
68. What does 't' represent in the figure (a)?  
(a) Collar (b) Prongs (c) Tail (d) Pins
69. What does figure (b) depict?  
(a) Adenovirus (b) Rhinovirus  
(c) Bacteriophage (d) Tobacco mosaic virus
70. Which does figure (c) depict?  
(a) Fungal cells (b) Sclereids  
(c) TMV (d) Bacteria
71. The secondary treatment of sewage waste is also known as \_\_\_\_\_.  
(a) Chemical treatment (b) Physical treatment  
(c) Biological treatment (d) Detoxification
72. Which of the following is used in secondary treatment of sewage water?  
(a) Fermentation tanks (b) Digester tanks  
(c) Detoxification tanks (d) Aeration tanks
73. What kind of microbes is present in 'flocs' formed during secondary treatment of sewage?  
(a) Aerobic (b) Anaerobic  
(c) Symbiotic (d) Aero tolerant
74. In context of secondary treatment of sewage, 'flocs' is associated with which microbes?  
(a) Bacteria and algae (b) Algae and fungus  
(c) Fungi and bacteria (d) Fungi and lichen
75. What is BOD?  
(a) Bacterial Oxygen Demand (b) Biological Organic Debris  
(c) Biochemical Organic Demand (d) Biochemical Oxygen Demand
76. The 'flocs' present in large aeration tanks causes \_\_\_\_\_ in BOD.  
(a) Decrease (b) Increase  
(c) No change (d) Either (a) or (b)

77. BOD can be defined as
- Amount of  $\text{CO}_2$  consumed if all the inorganic matter in one litre of water is oxidized by bacteria.
  - Amount of  $\text{O}_2$  consumed if all the organic matter in one decilitre of water is reduced by bacteria.
  - Amount of  $\text{O}_2$  consumed if all the organic matter in one litre of water is oxidized by bacteria.
  - Amount of  $\text{O}_2$  consumed if all the inorganic matter in one litre of water is oxidized by bacteria.
78. BOD is the measure of \_\_\_\_\_ in water.
- Organic matter
  - Inorganic matter
  - Bacterial load
  - Toxicity
79. BOD \_\_\_\_\_ polluting potential of waste water.
- Is not proportional to
  - Is directly proportional to
  - Is inversely proportional to
  - None of these
80. Once BOD from the sewage is reduced significantly, the 'flocs' are allowed to sediment and it is known as \_\_\_\_\_.
- Primary sludge
  - Secondary sludge
  - Activated sludge
  - Inactivated sludge
81. What is shown in this figure?



- Biogas plant
  - Sewage treatment plant
  - Fermentors
  - Distillation apparatus
82. The remaining major part of activated sludge is pumped into large tanks called \_\_\_\_\_.
- Aerobic fermenters
  - Anaerobic fermenters
  - Aerobic Sludge digesters
  - Anaerobic sludge digesters
83. In an anaerobic sludge digester, anaerobically digesting bacteria digest which microbes?
- Fungi
  - Bacteria
  - Algae
  - Both (a) and (b)

84. What is shown in the figure?



- (a) Transmission electron microscope  
(b) Fermentation plant  
(c) Sewage treatment  
(d) Large Hadron Collider
85. In an anaerobic sludge digester, during the digestion process, mixture of gases like \_\_\_\_\_ are produced.
- (a)  $\text{CH}_4$ ,  $\text{H}_2\text{O}$ ,  $\text{O}_2$   
(b)  $\text{C}_2\text{H}_6$ ,  $\text{H}_2\text{S}$ ,  $\text{CO}_2$   
(c)  $\text{CH}_4$ ,  $\text{H}_2\text{O}_2$ ,  $\text{CO}_2$   
(d)  $\text{CH}_4$ ,  $\text{H}_2\text{S}$ ,  $\text{CO}_2$
86. The gases that evolve from anaerobic sludge digester constitute \_\_\_\_\_.
- (a) Natural gas  
(b) Biogas  
(c) Water gas  
(d) None of these
87. After secondary treatment, the effluent is released into
- (a) Digester tank  
(b) Filtration unit  
(c) Water bodies  
(d) Chemical treatment unit
88. Which ministry has initiated Ganga Action Plan and Yamuna Action Plan?
- (a) Ministry of Chemicals and Fertilizers  
(b) Ministry of Health and Family Welfare  
(c) Ministry of Community Health and Diseases  
(d) Ministry of Environment and Forest
89. Which gas is the main constituent of biogas?
- (a)  $\text{H}_2\text{S}$   
(b)  $\text{CH}_4$   
(c)  $\text{C}_2\text{H}_6$   
(d)  $\text{C}_3\text{H}_8$
90. The gas produced as end-product during growth and metabolism of microbes depends on
- (a) Nature of microbe and substrate  
(b) Nature of digester tank and microbe  
(c) Nature of microbe only  
(d) Oxygen levels in the digester tank

**Microbes in Production of Biogas**

91. Methanogens produce certain gases by growing on cellulosic material. What kind of organisms are they?  
 (a) Fungi (b) Algae (c) Bacteria (d) Lichen
92. Methanogens are \_\_\_\_\_ microbes.  
 (a) Anaerobic (b) Aerobic  
 (c) Microaerophiles (d) Aerotobront
93. Methanogens produces which gases amongst the following list of gases?  
 $\text{CH}_4, \text{O}_2, \text{CO}_2, \text{H}_2\text{O}_2, \text{H}_2\text{S}, \text{H}_2$   
 (a)  $\text{CH}_4, \text{H}_2\text{O}_2, \text{H}_2$  (b)  $\text{H}_2\text{S}, \text{H}_2, \text{CO}_2$   
 (c)  $\text{CH}_4, \text{H}_2, \text{CO}_2$  (d)  $\text{H}_2\text{S}, \text{H}_2\text{O}_2, \text{CO}_2$
94. The most commonly found methanogens in anaerobic sludge is \_\_\_\_\_.  
 (a) Ethanobacterium (b) Methanobacterium  
 (c) Cyanobacterium (d) Both (b) and (c)
95. The rumen of cattle harbours which bacteria?  
 (a) Methanogens (b) Cyanobacteria  
 (c) Cellulogens (d) Ethanogens
96. What is the role of bacteria present in the rumen of cattle?  
 (a) Production of methane (b) Regulation of digestion  
 (c) Breakdown of cellulose (d) Synthesis of polysaccharides
97. Gobar gas is the same as \_\_\_\_\_.  
 (a) Water gas (b) Biogas  
 (c) Natural gas (d) None of these
98. The depth of concrete tank, a part of biogas plant, ranges from \_\_\_\_\_ to \_\_\_\_\_.  
 (a) 10–15 feet (b) 10–15 metre  
 (c) 15–20 feet (d) 15–20 metre
99. What is the input material for a biogas plant?  
 (a) Bio wastes (b) Slurry of dung  
 (c) Industrial waste (d) Both (a) and (b)
100. A \_\_\_\_\_ is placed over the slurry in biogas plant.  
 (a) Gas holder (b) Floating cover  
 (c) Digester (d) Gas filter
101. The spent slurry in a biogas plant is used as \_\_\_\_\_.  
 (a) Pesticide (b) Fertilizer  
 (c) Insecticide (d) Herbicide
102. Apart from cooking, biogas is generally used in rural areas for \_\_\_\_\_.  
 (a) Mechanical work (b) Lighting  
 (c) Chemical transformation (d) None of these
103. Which institutes have actively participated in the development of technology for biogas production?

IARI, IIT, IISC, KVIM, KVIC.

- (a) IIT and KVIM  
(b) IISC and KVIC  
(c) KVIC and IARI  
(d) IARI and KVIM

104. IARI stands for

- (a) Indian Aviation Research Institute  
(b) Indian Aerospace Research Institute  
(c) Indian Atomic Research Institute  
(d) Indian Agricultural Research Institute

### Microbes in Biocontrol Agents

105. Biocontrol refers to

- (a) Indiscriminate use of microbes for human welfare  
(b) Use of microbes to control plant diseases  
(c) Use of microbes to control cattle diseases  
(d) Both (b) and (c)

106. A beetle with 'red and black' markings is known as \_\_\_\_\_.

- (a) Dragonfly  
(b) Ladybird  
(c) Clever Wasp  
(d) Queen Ant

107. Dragonflies are useful to get rid of \_\_\_\_\_.

- (a) Ladybird  
(b) Aphids  
(c) Mosquitoes  
(d) Both (b) and (c)

108. Butterfly caterpillars can be controlled by use of the microbe \_\_\_\_\_.

- (a) *Bacillus stearothermophilus*  
(b) *Bacillus thuringiensis*  
(c) *Bacillus Chemophilus*  
(d) *Bacillus terminates*

109. 'Bt' is available in sachets as dried \_\_\_\_\_.

- (a) Spores  
(b) Capsules  
(c) Seeds  
(d) Both (a) and (b)

110. The figure shows:



- (a) Primary treatment  
(b) Activated sludge  
(c) Secondary treatment  
(d) Floccs

111. 'Bt' spores are mixed with \_\_\_\_\_ and sprayed on vulnerable plants.

- (a) Only alcohol  
(b) Any organic solvent  
(c) Only water  
(d) Any aqueous solvent



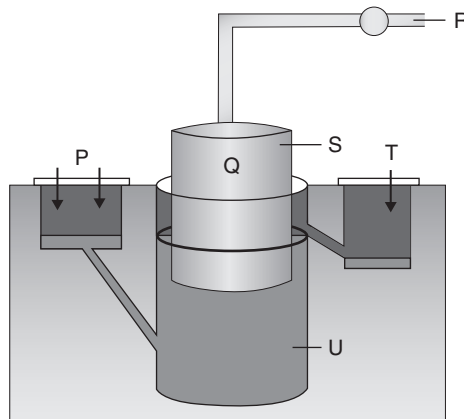
112. Scientists have introduced \_\_\_\_\_ gene into plants to impart resistance to insect pests.  
(a) Ct gene (b) Bt gene  
(c) Tt gene (d) Mt gene
113. Which fungus is used in plants to provide control against pests?  
(a) *Aspergillus* (b) *Trichoderma*  
(c) *Trichophyton* (d) *Rhizopus*
114. \_\_\_\_\_ are the pathogens that attack insects and other arthropods.  
(a) *Rhinovirus* (b) *Baculovirus*  
(c) *Ranikhet Virus* (d) *Bean Virus*
115. Baculovirus belongs to the genus  
(a) *Retrohedro Virus* (b) *Nucleohedero-Virus*  
(c) *Nucleopolyhedro Virus* (d) *Polyhedral Virus*
116. IPM stands for  
(a) Indian Pollution Management (b) Institute of Pest Management  
(c) Integrated Pest Management (d) Institute of Pollution Management
117. Root nodules of leguminous plants bear which microbe?  
(a) *Rhizopus* (b) *Rhino virus*  
(c) *Rhizome* (d) *Rhizobium*
118. This image is an aerial view of a \_\_\_\_\_ .



- (a) Nuclear reactor (b) Sewage plant  
(c) Biogas plant (d) Fermentation plant
119. \_\_\_\_\_ are free living bacteria which fix atmospheric nitrogen in soil.  
(a) *Azobacterium* (b) *Acetobacterium*  
(c) *Azotobacter* (d) *Azabacterium*

120. Fungi which form symbiotic associations with plants are \_\_\_\_\_.
- (a) *Rhizobium* (b) *Mycorrhiza*  
 (c) *Azospirillum* (d) *Oscillatoria*
121. Mycorrhiza absorbs \_\_\_\_\_ from soil and passes it to the plant.
- (a) K (b) P  
 (c) Fe (d) Mg
122. \_\_\_\_\_ bacteria fixes atmospheric  $N_2$  in aquatic and terrestrial environments.
- (a) *Cyanobacteria* (b) *Azotobacter*  
 (c) *Methanobacteria* (d) *Mycorrhiza*
123. \_\_\_\_\_ serve as an important bio-fertilizer in paddy fields.
- (a) *Cyanobacteria* (b) *Azotobacter*  
 (c) *Methanobacterium* (d) *Mycorrhiza*
124. Which microbe adds organic matter to the soil to increase its fertility?
- (a) *Cyanobacteria* (b) *Blue-green algae*  
 (c) *Rhizobium* (d) *Trichoderma*

**Figure given for questions 125 – 129.**



125. What does 'P' indicate in the figure?
- (a) Dung and vegetable waste (b) Water and dung  
 (c) Vegetable and human excreta (d) All of these
126. What does 'R' indicate in the figure?
- (a) Effluent (b) Gas  
 (c) Gas holder (d) Filtration
127. What does 'S' indicate in the figure?
- (a) Digester (b) Gas purifier  
 (c) Gas holder (d) Sludge tank

128. What does 'T' indicate in the figure?  
(a) By-product collector (b) Sludge  
(c) Digester (d) Gas holder
129. What does 'U' indicate in the figure?  
(a) Gas holder (b) Digester  
(c) Sludge (d) Waste collector

---

### ASSERTION AND REASON QUESTIONS

---

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.  
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.  
(c) If the assertion is true but the reason is false.  
(d) If both the assertion and reason are false.

130. **Assertion:** In paddy field, cyanobacteria serves as an important biofertilizer.  
**Reason:** Cyanobacteria can fix atmosphere nitrogen.
131. **Assertion:** Prions are proteinaceous infectious agents.  
**Reason:** Prions are made up of nucleoproteins.
132. **Assertion:** LAB grows in milk and converts milk into curd.  
**Reason:** LAB produces acid that coagulate and partially digest the milk protein.
133. **Assertion:** There are large holes present in Swiss cheese.  
**Reason:** Large holes are produced due to the production of large amount of  $\text{SO}_2$  by *Propionibacterium shermanii*.
134. **Assertion:** Wine and beer are produced without distillation.  
**Reason:** Brewer's yeast is used for fermentation of malted cereals and fruit juices.
135. **Assertion:** Lipases are used in detergent formation.  
**Reason:** Lipases help in removing oily stains from laundry.
136. **Assertion:** Bottled fruit juices bought from the market are clearer as compared to those made at home.  
**Reason:** Bottled juices are clarified by the use of pectinases and proteases.
137. **Assertion:** Streptokinase is given to patients suffering from myocardial infarction.  
**Reason:** Streptokinase acts as a clot -buster.
138. **Assertion:** Greater is BOD of waste water, more is its polluting potential.  
**Reason:** BOD is a measure of organic matter present in water.

139. **Assertion:** Bacterial colony can be seen with the naked eyes  
**Reason:** Bacteria are macro-organism.
140. **Assertion:** Microbes can cause diseases in animals and plants  
**Reason:** All microbes are harmful to us.
141. **Assertion:** LAB increases nutritional quality of milk by converting milk to curd.  
**Reason:** It increases vitamin B<sub>12</sub> content of curd.
142. **Assertion:** Antibiotics are chemical substance produces by some microbes and can kill or retard the growth of other microbes.  
**Reason:** Meaning of antibiotic is against life for human.
143. **Assertion:** Lactic acid is produced by lactobacillus.  
**Reason:** Citric acid is produced by *Aspergillus niger*.
144. **Assertion:** We give cyclosporin A to organ transplanted patients.  
**Reason:** It is an immunosuppressive agent.
145. **Assertion:** Statins reduces blood cholesterol level.  
**Reason:** They competitively inhibit the enzyme responsible for synthesis of cholesterol.
146. **Assertion:** Before disposal sewage is treated in sewage treatment plant.  
**Reason:** STPs make sewage less polluting.
147. **Assertion:** *Azospirillum* and *Azotobacter* enriching the nitrogen content of soil.  
**Reason:** They are free living nitrogen fixer in soil.
148. **Assertion:** A small part of activated sludge is pumped back into aeration tank.  
**Reason:** It serves as inoculum.

---

### PREVIOUS YEAR QUESTIONS

---

1. When domestic sewage mixes with river water [AIPMT MAINS 2010]
- (a) Small animals like rats will die after drinking river water.
  - (b) The increased microbial activity releases micronutrients such as iron.
  - (c) The increased microbial activity uses up dissolved oxygen.
  - (d) The river water is still suitable for drinking as impurities are only about 0.1 per cent.
2. An example of endomycorrhiza is [AIPMT MAINS 2010]
- (a) *Nostoc*
  - (b) *Glomus*
  - (c) *Agaricus*
  - (d) *Rhizobium*
3. Select the correct statement from the following. [AIPMT PRE 2010]
- (a) Biogas is produced by the activity of aerobic bacteria on animal waste.
  - (b) *Methanobacterium* is an aerobic bacterium found in rumen of cattle.
  - (c) Biogas, commonly called gobar gas, is pure methane.
  - (d) Activated sludge-sediment in settlement tank of sewage treatment plant is a rich source of aerobic bacteria.

4. A common biocontrol agent for the control of plant diseases is [AIPMT PRE 2010]  
(a) Baculovirus (b) *Bacillus thuringiensis*  
(c) *Glomus* (d) *Trichoderma*
5. Which one of the following is not used in organic farming? [AIPMT PRE 2010]  
(a) *Glomus* (b) Earthworm  
(c) *Oscillatoria* (d) Snail
6. Read the following statement having two blanks (A and B).  
“A drug used for A patients is obtained from a species of the organism B”  
The one correct option for the two blanks is [AIPMT MAINS 2011]
- | A                    | B           |
|----------------------|-------------|
| (a) Heart            | Penicillium |
| (b) Organ-transplant | Trichoderma |
| (c) Swine flu        | Monascus    |
| (d) AIDS             | Pseudomonas |
7. Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct? [AIPMT MAINS 2011]  
(a) Yeast – statins  
(b) *Acetobacter aceti* – acetic acid  
(c) *Clostridium butylicum* – lactic acid  
(d) *Aspergillus niger* – citric acid
8. Which of the following is mainly produced by the activity of anaerobic bacteria on sewage? [AIPMT PRE 2011]  
(a) Propane (b) Mustard gas  
(c) Marsh gas (d) Laughing gas
9. Which one of the following helps in absorption of phosphorus from soil by plants? [AIPMT PRE 2011]  
(a) *Rhizobium* (b) *Frankia*  
(c) *Anabaena* (d) *Glomus*
10. The continuous addition of sugars in ‘fed batch’ fermentation is done to [AIPMT PRE 2011]  
(a) Obtain antibiotics (b) Purify enzymes  
(c) Degrade sewage (d) Produce methane
11. Secondary sewage treatment is mainly a [AIPMT PRE 2011]  
(a) Mechanical process (b) Chemical process  
(c) Biological process (d) Physical process
12. Which one of the following is not a biofertilizer? [AIPMT PRE 2011]  
(a) *Rhizobium* (b) *Nostoc*  
(c) *Mycorrhiza* (d) *Agrobacterium*

13. The most common substrate used in distilleries for the production of ethanol is [AIPMT PRE 2011]
- (a) Soya meal (b) Ground gram  
(c) Molasses (d) Corn meal
14. Ethanol is commercially produced through a particular species of [AIPMT PRE 2011]
- (a) Clostridium (b) Trichoderma  
(c) Aspergillus (d) Saccharomyces
15. In gobar gas, the maximum amount is that of [AIPMT MAINS 2012]
- (a) Methane (b) Propane  
(c) Carbon dioxide (d) Butane
16. Read the following four statements (A to D):  
(A) Colostrum is recommended for the new born because it is rich in antigen.  
(B) Chikungunya is caused by a Gram negative bacterium.  
(C) Tissue culture has proved useful in obtaining virus-free plants.  
(D) Beer is manufactured by distillation of fermented grape juice. [AIPMT MAINS 2012]
- How many of the above statements are wrong?
- (a) Three (b) Four  
(c) One (d) Two
17. The domestic sewage in large cities [AIPMT MAINS 2012]
- (a) Is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plant (STPs).  
(b) When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen.  
(c) Has very high amounts of suspended solids and dissolved salts.  
(d) Has a high BOD as it contains both aerobic and anaerobic bacteria.
18. *Monascus purpureus* is a yeast used commercially in the production of [AIPMT PRE 2012]
- (a) Ethanol  
(b) Streptokinase for removing clots from the blood vessels  
(c) Citric acid  
(d) Blood cholesterol lowering statins
19. A patient brought to a hospital with myocardial infarction is normally immediately given [AIPMT PRE 2012]
- (a) Penicillin (b) Streptokinase  
(c) Cyclosporin-A (d) Statins
20. Which of the following microbes forms symbiotic association with plants and helps them in their nutrition? [AIPMT PRE 2012]
- (a) Azotobacter (b) Aspergillus  
(c) Glomus (d) Trichoderma

21. Yeast is used in the production of [AIPMT PRE 2012]  
(a) Citric acid and lactic acid (b) Lipase and pectinase  
(c) Bread and beer (d) Cheese and butter
22. A nitrogen-fixing microbe associated with Azolla in rice field is [AIPMT PRE 2012]  
(a) Spirulina (b) Anabaena  
(c) Frankia (d) Tolypothrix
23. Which one of the following is an example that carries out biological control of pests/diseases using microbes? [AIPMT PRE 2012]  
(a) Trichoderma sp. against certain plant pathogens  
(b) Nucleopolyhedrovirus against white rust in Brassica  
(c) Bt-cotton to increase cotton yield  
(d) Ladybird beetle against aphids in mustard
24. A good producer of citric acid is [AIPMT 2013]  
(a) Aspergillus (b) Pseudomonas  
(c) Clostridium (d) Saccharomyces
25. Which of the following are likely to be present in deep sea water? [AIPMT 2013]  
(a) Archaeobacteria (b) Eubacteria  
(c) Blue-green algae (d) Saprophytic fungi
26. During sewage treatment, biogases are produced which includes [AIPMT 2015]  
(a) Methane, hydrogen sulphide, carbon dioxide  
(b) Methane, oxygen, hydrogen sulphide  
(c) Hydrogen sulphide, methane, sulphur dioxide  
(d) Hydrogen sulphide, nitrogen, methane
27. What gases are produced in anaerobic sludge digesters? [AIPMT 2014]  
(a) Methane and CO<sub>2</sub> only  
(b) Methane, hydrogen sulphide and CO<sub>2</sub>  
(c) Methane, hydrogen sulphide and O<sub>2</sub>  
(d) Hydrogen sulphide and CO<sub>2</sub>
28. High value of BOD (Biochemical Oxygen Demand) indicates that [AIPMT 2015]  
(a) Water is pure  
(b) Water is highly polluted  
(c) Water is less polluted  
(d) Consumption of organic matter in the water is higher by the microbes

29. Match the following list of microbes and their importance:

- |                                        |                                                 |
|----------------------------------------|-------------------------------------------------|
| (a) <i>Saccharomyces cerevisiae</i>    | Production of immunosuppressive agents          |
| (b) <i>Monascus purpureus</i>          | Ripening of Swiss cheese                        |
| (c) <i>Trichoderma polysporum</i>      | Commercial production of ethanol                |
| (d) <i>Propionibacterium shermanii</i> | Production of blood-cholesterol lowering agents |

[RE-AIPMT 2015]

- |     |       |       |      |       |
|-----|-------|-------|------|-------|
|     | (a)   | (b)   | (c)  | (d)   |
| (a) | (iv)  | (iii) | (ii) | (i)   |
| (b) | (iv)  | (ii)  | (i)  | (iii) |
| (c) | (iii) | (i)   | (iv) | (ii)  |
| (d) | (iii) | (iv)  | (i)  | (ii)  |

30. Which of the following is wrongly matched in the given table?

[NEET - I, 2016]

|     | Microbe                       | Product       | Application                       |
|-----|-------------------------------|---------------|-----------------------------------|
| (a) | <i>Trichoderma polysporum</i> | Cyclosporin A | Immunosuppressive drug            |
| (b) | <i>Monascus purpureus</i>     | Statins       | Lowering of blood cholesterol     |
| (c) | <i>Streptococcus</i>          | Streptokinase | Removal of clot from blood vessel |
| (d) | <i>Clostridium butylicum</i>  | Lipase        | Removal of oil stains             |

31. Match Column – I with Column – II and select the correct options using the codes given below:

[NEET - II, 2016]

**Column – I**

- A. Citric acid
- B. Cyclosporine A
- C. Statins
- D. Butyric acid

- (a) A:3, B:1, C:4, D:2
- (b) A:1, B:4, C:2, D:3
- (c) A:3, B:4, C:1, D:2
- (d) A:3, B:1, C:2, D:4

**Column – II**

1. *Trichoderma*
2. *Clostridium*
3. *Aspergillus*
4. *Monascus*

### NCERT EXEMPLAR QUESTIONS

1. The vitamin whose content increases following the conversion of milk into curd by lactic acid bacteria is
 

|                             |               |
|-----------------------------|---------------|
| (a) Vitamin C               | (b) Vitamin D |
| (c) Vitamin B <sub>12</sub> | (d) Vitamin E |
2. Wastewater treatment generates a large quantity of sludge, which can be treated by:
 

|               |                      |
|---------------|----------------------|
| (a) Digesters | (b) Activated sludge |
| (c) Chemicals | (d) Oxidation pond   |
3. Methanogenic bacteria are not found in
 

|                     |
|---------------------|
| (a) Rumen of cattle |
| (b) Gobar gas plant |



- (c) Bottom of water-logged paddy fields
- (d) Activated sludge

4. Match the following list of bacteria and their commercially important products.

| <b>Bacterium</b>                   | <b>Product</b>   |
|------------------------------------|------------------|
| (i) <i>Aspergillus niger</i>       | (A) Lactic acid  |
| (ii) <i>Acetobacter aceti</i>      | (B) Butyric acid |
| (iii) <i>Clostridium butylicum</i> | (C) Acetic acid  |
| (iv) <i>Lactobacillus</i>          | (D) Citric acid  |

Choose the correct match:

|                            |                            |
|----------------------------|----------------------------|
| (a) i-B, ii-C, iii-D, iv-A | (b) i-B, ii-D, iii-C, iv-A |
| (c) i-D, ii-C, iii-B, iv-A | (d) i-D, ii-A, iii-C, iv-B |

5. Match the following list of bioactive substances and their roles:

| <b>Bioactive substance</b> | <b>Role</b>                             |
|----------------------------|-----------------------------------------|
| (i) Statin                 | (A) Removal of oil stains               |
| (ii) Cyclosporin A         | (B) Removal of clots from blood vessels |
| (iii) Streptokinase        | (C) Lowering of blood cholesterol       |
| (iv) Lipase                | (D) Immunosuppressive agent             |

Choose the correct match:

|                            |                            |
|----------------------------|----------------------------|
| (a) i-B, ii-C, iii-A, iv-D | (b) i-D, ii-B, iii-A, iv-C |
| (c) i-D, ii-A, iii-B, iv-C | (d) i-C, ii-D, iii-B, iv-A |

6. The primary treatment of waste water involves the removal of

- |                          |                      |
|--------------------------|----------------------|
| (a) Dissolved impurities | (b) Stable particles |
| (c) Toxic substances     | (d) Harmful bacteria |

7. BOD of waste water is estimated by measuring the amount of

- |                          |                                  |
|--------------------------|----------------------------------|
| (a) Total organic matter | (b) Biodegradable organic matter |
| (c) Oxygen evolution     | (d) Oxygen consumption           |

8. Which one of the following alcoholic drinks is produced without distillation?

- |          |            |
|----------|------------|
| (a) Wine | (b) Whisky |
| (c) Rum  | (d) Brandy |

9. The technology of biogas production from cow dung was developed in India largely due to the efforts of

- (a) Gas Authority of India
- (b) Oil and Natural Gas Commission
- (c) Indian Agricultural Research Institute and Khadi and Village Industries Commission
- (d) Indian Oil Corporation

10. The free-living fungus *Trichoderma* can be used for

- (a) Killing insects
- (b) Biological control of plant diseases
- (c) Controlling butterfly caterpillars
- (d) Producing antibiotics

11. What would happen if oxygen availability to the activated sludge flocs is reduced?

- (a) It will slow down the rate of degradation of organic matter.
- (b) The centre of flocs will become anoxic, which would cause the death of bacteria and eventually breakage of flocs.

- (c) Flocs would increase in size as anaerobic bacteria would grow around flocs.  
(d) Protozoa would grow in large numbers.
12. Mycorrhiza does not help the host plant in  
(a) Enhancing its phosphorus uptake capacity  
(b) Increasing its tolerance to drought  
(c) Enhancing its resistance to root pathogens  
(d) Increasing its resistance to insects
13. Which one of the following is not a nitrogen fixing organism?  
(a) *Anabaena* (b) *Nostoc*  
(c) *Azotobacter* (d) *Pseudomonas*
14. Big holes in Swiss cheese are made by a  
(a) Machine  
(b) Bacterium that produces methane gas.  
(c) Bacterium producing a large amount of carbon dioxide.  
(d) Fungus that releases lot of gases during its metabolic activities.
15. The residue left after methane production from cattle dung is  
(a) Burnt (b) Buried in landfills  
(c) Used as manure (d) Used in civil construction
16. Methanogens do not produce  
(a) Oxygen (b) Methane  
(c) Hydrogen sulphide (d) Carbon dioxide
17. Activated sludge should have the ability to settle quickly so that it can  
(a) Be rapidly pumped back from sedimentation tank to aeration tank.  
(b) Absorb pathogenic bacteria present in waste water while sinking to the bottom of the settling tank.  
(c) Be discarded and anaerobically digested.  
(d) Absorb colloidal organic matter.
18. Match the items in 'Column-A' and 'Column-B' and choose the correct answer.
- | Column-A                 | Column-B                    |
|--------------------------|-----------------------------|
| (i) Lady bird            | (A) <i>Methanobacterium</i> |
| (ii) Mycorrhiza          | (B) <i>Trichoderma</i>      |
| (iii) Biological control | (C) Aphids                  |
| (iv) Biogas              | (D) <i>Glomus</i>           |
- The correct answer is  
(a) i-B, ii-D, iii-C, iv-A (b) i-C, ii-D, iii-B, iv-A  
(c) i-D, ii-A, iii-B, iv-C (d) i -C, ii-B, iii-A, iv-D
19. Which one is the most important role of micro organism for the wellbeing of humans?  
(a) Sewage treatment (b) Production of methane  
(c) Biological control of plant disease (d) Conversion of milk to curd

## Answer Keys

### *Practice Questions*

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (a)   | 2. (c)   | 3. (b)   | 4. (b)   | 5. (c)   | 6. (c)   | 7. (c)   | 8. (d)   | 9. (c)   | 10. (b)  |
| 11. (c)  | 12. (b)  | 13. (c)  | 14. (b)  | 15. (b)  | 16. (c)  | 17. (d)  | 18. (c)  | 19. (c)  | 20. (d)  |
| 21. (c)  | 22. (c)  | 23. (b)  | 24. (b)  | 25. (c)  | 26. (b)  | 27. (a)  | 28. (b)  | 29. (b)  | 30. (c)  |
| 31. (b)  | 32. (c)  | 33. (a)  | 34. (b)  | 35. (b)  | 36. (c)  | 37. (a)  | 38. (a)  | 39. (b)  | 40. (c)  |
| 41. (c)  | 42. (b)  | 43. (b)  | 44. (b)  | 45. (c)  | 46. (a)  | 47. (b)  | 48. (b)  | 49. (b)  | 50. (c)  |
| 51. (b)  | 52. (b)  | 53. (c)  | 54. (b)  | 55. (c)  | 56. (c)  | 57. (c)  | 58. (d)  | 59. (b)  | 60. (d)  |
| 61. (c)  | 62. (c)  | 63. (a)  | 64. (b)  | 65. (c)  | 66. (a)  | 67. (b)  | 68. (d)  | 69. (a)  | 70. (c)  |
| 71. (c)  | 72. (d)  | 73. (a)  | 74. (c)  | 75. (d)  | 76. (a)  | 77. (c)  | 78. (a)  | 79. (b)  | 80. (c)  |
| 81. (c)  | 82. (d)  | 83. (d)  | 84. (b)  | 85. (d)  | 86. (b)  | 87. (c)  | 88. (d)  | 89. (b)  | 90. (a)  |
| 91. (c)  | 92. (a)  | 93. (c)  | 94. (b)  | 95. (a)  | 96. (c)  | 97. (b)  | 98. (a)  | 99. (d)  | 100. (b) |
| 101. (b) | 102. (b) | 103. (c) | 104. (d) | 105. (b) | 106. (b) | 107. (d) | 108. (b) | 109. (a) | 110. (c) |
| 111. (c) | 112. (b) | 113. (b) | 114. (b) | 115. (c) | 116. (c) | 117. (d) | 118. (b) | 119. (c) | 120. (b) |
| 121. (b) | 122. (a) | 123. (a) | 124. (b) | 125. (b) | 126. (b) | 127. (c) | 128. (b) | 129. (b) |          |

### *Assertion and Reason Questions*

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 130. (a) | 131. (c) | 132. (a) | 133. (c) | 134. (b) | 135. (a) | 136. (a) | 137. (a) | 138. (b) | 139. (c) |
| 140. (c) | 141. (a) | 142. (c) | 143. (b) | 144. (a) | 145. (a) | 146. (a) | 147. (a) | 148. (a) |          |

### *Previous Year Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (b)  | 3. (d)  | 4. (d)  | 5. (d)  | 6. (b)  | 7. (c)  | 8. (c)  | 9. (d)  | 10. (b) |
| 11. (c) | 12. (d) | 13. (c) | 14. (d) | 15. (a) | 16. (a) | 17. (a) | 18. (d) | 19. (b) | 20. (c) |
| 21. (c) | 22. (b) | 23. (c) | 24. (a) | 25. (a) | 26. (a) | 27. (b) | 28. (b) | 29. (d) | 30. (d) |
| 31. (a) |         |         |         |         |         |         |         |         |         |

### *NCERT Exemplar Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (a)  | 3. (d)  | 4. (c)  | 5. (d)  | 6. (b)  | 7. (d)  | 8. (a)  | 9. (c)  | 10. (b) |
| 11. (b) | 12. (d) | 13. (d) | 14. (c) | 15. (c) | 16. (a) | 17. (a) | 18. (b) | 19. (c) |         |

# Biotechnology

**Chapter 11:** Biotechnology Principles and Processes

**Chapter 12:** Biotechnology and Its Application

## Students Note

This unit comprises two chapters—Biotechnology: Principles and Processes and Biotechnology and its Applications. It is advised that before reading this unit, you need to go through the chapter on Molecular Basis of Inheritance. Some topics like RNA-i Mechanism, PCR Technique, Blotting technique and Gene Therapy require in-depth knowledge. Hence, read all these topics in detail, as from this topic, 3 to 5 questions are asked every year in AIPMT. Again, diagrams are very important, so study them carefully.

*This page is intentionally left blank.*

# Biotechnology

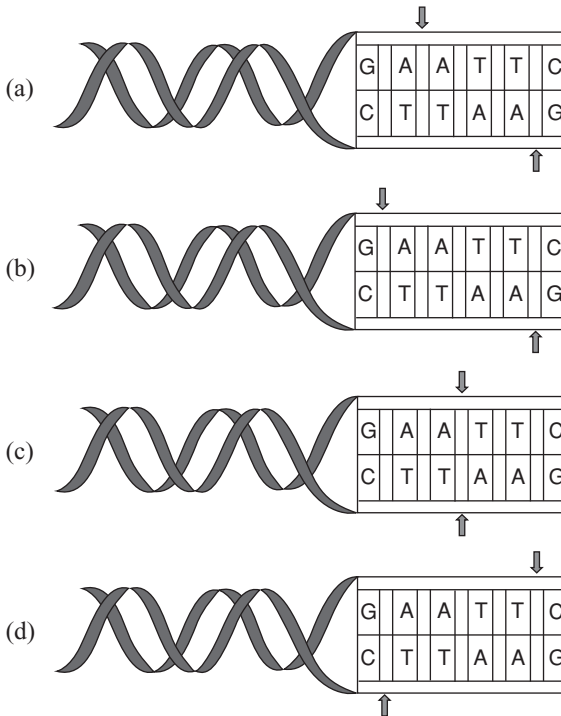
## Principles and Processes

### PRACTICE QUESTIONS

#### Recombinant DNA Technology

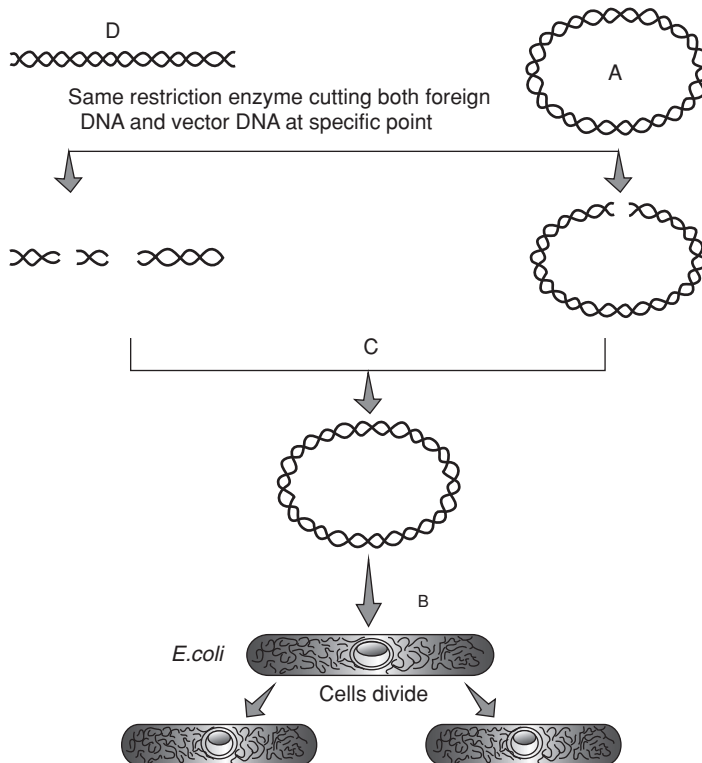
1. Biotechnology deals with techniques of using which of the following to produce product and processes useful to humans?
  - (a) Enzyme from organism
  - (b) Live organism
  - (c) Vitamins
  - (d) Both (a) and (b)
2. Biotechnology mainly uses
  - (a) GMO
  - (b) Bacteria
  - (c) Virus
  - (d) Animals
3. Select the process/technique included under biotechnology.
  - (a) IVF (test tube baby)
  - (b) Gene synthesis
  - (c) Developing DNA vaccine
  - (d) All of these
4. Which of the following is true about EFB definition of biotechnology?
  - (a) It includes traditional view.
  - (b) It includes modern molecular biotechnology.
  - (c) Definition is the integration of natural science and organisms, cells, parts thereof, and molecular analogues for products and services.
  - (d) All the above
5. Which of the following can be biotechnological products?
  - (a) Antibiotics
  - (b) Vaccine
  - (c) Enzymes
  - (d) All of these
6. Select the false statement from the following.
  - (a) Genetic engineering includes techniques to alter chemistry of genetic material (DNA and RNA).
  - (b) Sexual reproduction is more advantageous than asexual reproduction.
  - (c) Genetic engineering allows us to introduce desirable set of genes without the undesirable gene into the target organism.
  - (d) Plasmid is autonomously replicating linear extra chromosomal DNA.
7. Multiplication of alien DNA in organism requires
  - (a) ROP
  - (b) ORI
  - (c) Stop codon
  - (d) TATA box

8. We can cut DNA with the help of
- (a) DNAase (b) RNAase  
(c) Knife (d) Restriction enzyme
9. For making GMO, the three basic steps that are required are
- (a) Identification of DNA with desirable gene.  
(b) Introduction of identified DNA into the host.  
(c) Maintenance of introduced DNA in the host and transfer of the DNA to its progeny.  
(d) All the above
10. Who isolated antibiotic resistance gene from salmonella typhimurium in 1972?
- (a) Jacob and Monod (b) Stanley Cohen and Herbert Boyer  
(c) Osborn (d) Boliver
11. Which diagram correctly represents the cutting of both strands of DNA by EcoRI?



12. Hind II recognizes a specific sequence of how many base pairs?
- (a) 4 (b) 6  
(c) 8 (d) 10
13. The sequence recognized by restriction endonucleases
- (a) ORI (b) Recognition sequence  
(c) Palindrome sequence (d) Both (b) and (c)

14. Select the incorrect statement.
- (a) More than 900 restriction enzymes have been isolated from over 230 strains of bacteria.
  - (b) In the year 1963, the two enzymes responsible for restricting the growth of bacteriophage in *Escherichia coli* were isolated.
  - (c) Some key tools for recombinant DNA technology are restriction enzyme, polymerase enzyme, ligase, vectors and host root organisms.
  - (d) EcoRI cut the DNA between bases A and T only when the sequence GAATTC is present in the DNA.
15. In 'EcoRI' R stands for
- (a) Genus
  - (b) Species
  - (c) Strain
  - (d) Restriction enzyme
16. In 'EcoRI' 'co' stands for
- (a) Genus
  - (b) Species
  - (c) Strain
  - (d) Restriction enzyme
17. What is 'B' in the figure?



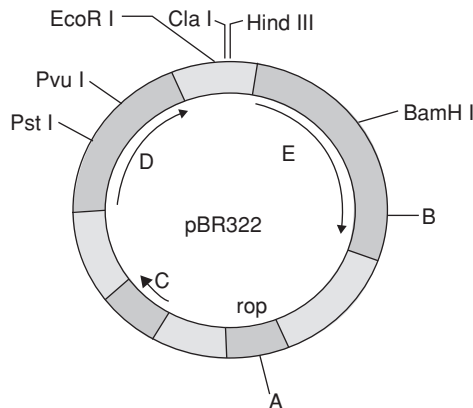
- (a) Transformation
- (b) Transduction
- (c) Conjugation
- (d) Vector DNA



18. Restriction enzyme breaks
- (a) Glycosidic linkage (b) H-bond  
(c) Sugar-phosphate linkage (d) All of these
19. The sequence recognized by EcoRI is
- (a) 5'-GAATTC-3' 3'-CTTAAG-5' (b) 5'-CCAATG-3' 3'-GAATCC-5'  
(c) 5'-GATACC-3' 3'-CCTAAG-5' (d) 5'-CATTAG-3' 3'-GATAAC-5'
20. EcoRI cuts palindrome sequence which produces overhanging stretches called sticky ends on each strand. These are named sticky because
- (a) They can combine with any DNA.  
(b) They form hydrogen bonds with their complementary cut counterpart.  
(c) They facilitate the action of the enzyme DNA ligase.  
(d) Both (b) and (c)
21. The extraction of DNA from a gel piece is known as
- (a) Spooling (b) Elution  
(c) AGE (d) Annealing
22. The fragmented DNA can be visualized by staining DNA with
- (a) NaCl (b) Ethidium bromide  
(c) Ethylene bromide (d) NaBr
23. For cloning of foreign DNA it is attached with *ori* gene of vector which controls
- (a) Replication (b) Copy number of replicating DNA  
(c) Both (a) and (b) (d) None of these
24. Find the true statement.
- (a) *Ori* means origin of transcription.  
(b) Some bacterial cell may have copy number of plasmid that varies from 15–100.  
(c) Vector should have many recognition sites for commonly used restriction enzymes so that alien DNA can attach to any one of the sites easily.  
(d) TetR gene in pBR322 can be cleaved by PvuI and PstI.
25. Which of the following antibiotic resistance genes are used as selectable marker for *E. coli*?
- (a) Chloramphenicol (b) Tetracycline  
(c) Kanamycin (d) All of these
26. If alien DNA is introduced using Sall in pBR322 then transformant will grow on
- (a) Ampicillin (b) Tetracycline  
(c) Both (a) and (b) (d) None of these
27. Select the incorrect matching.
- 
- (a) pBR322 – *E. coli* cloning vector  
(b) EcoRI, Cla I, Hind III – Restriction enzyme  
(c) ROP – Protein involved in the replication of the plasmid  
(d) PCR – Technique in which multiple copies of the gene (or DNA) of interest is synthesized in vitro
-

28. Select the incorrect statement.
- Selection of recombinants due to inactivation of antibiotic is a cumbersome procedure.
  - Insertional inactivation of  $\beta$ -galactosidase leads to colourless colonies.
  - Insertional inactivation of  $\beta$ -galactosidase leads to blue color colonies.
  - In insertional inactivation, the rDNA is inserted within the coding sequence of an enzyme  $\beta$ -galactosidase.
29. Which vector is use to deliver gene in animal cell?
- Retroviruses
  - Disarmed retroviruses
  - Ti-plasmid
  - E. coli*
30. To make bacterium competent (Transformation with recombinant DNA) we use
- Specific concentration of  $Ca^{2+}$  ion
  - Heat shock ( $42^{\circ}C$ )
  - Both (a) and (b)
  - None of these
31. By which method is rDNA directly placed in nucleus of animal cell?
- Gene gun (biolistics)
  - Heat shock
  - $CaCl_2$
  - Micro-injection
32. The way to introduce alien DNA into host cell includes
- Disarmed pathogens
  - Biolistics or gene gun
  - Micro-injection
  - All of these
33. Which method is suitable for transferring an alien DNA into a plant cell?
- $CaCl_2$
  - Biolistics or gene gun
  - Micro-infection
  - Heat shock

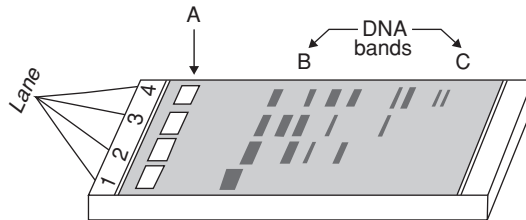
**Figure given for questions 34 and 35.**



34. Restriction enzyme 'A' is
- PstI
  - PVUII
  - BamHI
  - Sall
35. 'E' is
- $Amp^R$  gene
  - $tet^R$  gene
  - $Chlor^R$  gene
  - $Eco^R$  gene



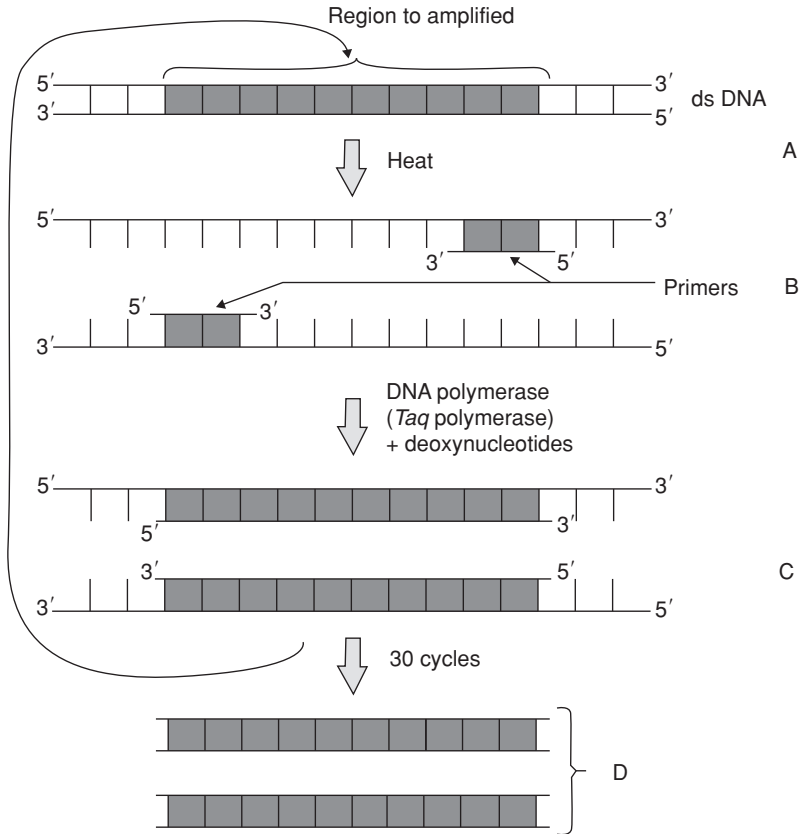
46. The host cultured in a continuous culture system where inside the used medium is drained out from one side while fresh medium is added from the other to maintain cells in their physiologically \_\_\_\_\_ phase.
- (a) Lag (b) Log  
(c) Stationary (d) Declining
47. Bioreactors have
- (a) Foam control system, temperature control system  
(b) Oxygen delivery system  
(c) pH control system  
(d) All the above
48. Which of the following will be done with product formed by rDNA technology?
- (a) Product has to be formulated with suitable preservation.  
(b) Formulation has to undergo clinical trials.  
(c) Strict quality control testing is done.  
(d) All the above
49. Which of the following DNA is undigested by restriction endonuclease in this diagram?



- (a) Lane 1 (b) Lane 2  
(c) Lane 3 (d) Lane 4
50. rDNA is a
- (a) Chimeric DNA  
(b) Hybrid DNA-RNA  
(c) Recombinant of vector DNA and desired gene/s  
(d) Both (a) and (c)
51. Foreign DNA is also called
- (a) Vehicle DNA (b) Passenger DNA  
(c) rDNA (d) Vector DNA
52. Plasmids are
- (a) ssDNA (b) dsDNA (linear)  
(c) dsDNA (circular) (d) denatured-DNA
53. pBR322 is the most extensively studied
- (a) Plasmid DNA of *E. coli* (b) Foreign gene  
(c) rDNA (d) Clone
54. Restriction enzymes recognize specific
- (a) Palindromic region (b) Exons  
(c) Introns (d) None of these

55. The first restriction enzyme was isolated from  
(a) *E. coli* (b) *Haemophilus influenzae*  
(c) *Pseudomonas* (d) *Xanthomonas*
56. Restriction endonuclease is a  
(a) Enzyme for transcription (b) Molecular blade  
(c) Enzyme for replication (d) Enzyme for transduction
57. Restriction enzymes of *E. coli* are  
(a) HindIII (b) BamHI  
(c) EcoRI, EcoRII (d) All of these
58. Plasmids are  
(a) Extranuclear genes of bacteria (b) Endosymbiont of bacterial cells  
(c) Best vector DNA (d) All of these
59. The best cloning organism for genetic engineering and biotechnology is  
(a) *Agrobacterium* (b) *Pseudomonas*  
(c) *E. coli* (d) Lambda phage
60. Bacteriophages are used in biotechnology as  
(a) Vector or vehicle DNA (b) Cloning organism  
(c) Restriction enzyme synthesizers (d) None of these
61. The ability to form tumours is found in plasmids of  
(a) *E. coli* (b) *Pseudomonas*  
(c) *Agrobacterium* (d) *Pneumococcus*
62. Engineered bacterium carries  
(a) Plasmids (b) rDNA  
(c) cDNA (d) ssDNA
63. Engineered bacteria are reproduced by inserting  
(a) Plasmids DNA  
(b) Desired DNA (gene/s) loaded on vector DNA  
(c) Vehicle DNA  
(d) Phage DNA
64. Oncogenic character is seen in  
(a) *E. coli* (b) pBR322  
(c)  $T_i$  plasmids (d)  $R_i$  plasmids
65. Transgenic plants are produced by inserting desired genes in  
(a) pBR322 (b)  $T_i$  plasmids  
(c) Lambda phage (d) None of these
66. Which is not a vector for rDNA technology?  
(a) Plasmids (b) Cosmids  
(c) Phages (d) Mosquitoes
67. Broken ends of two DNA strands are joined by  
(a) Exonuclease (b) Endonuclease  
(c) DNA ligase (d) Gyrase

68. Which of the following is a correct matching?



|                   |                                                  |
|-------------------|--------------------------------------------------|
| (a) Denaturation  | Occurs at room temperature                       |
| (b) Annealing     | DNA polymerase is required for this process      |
| (c) Extension     | Taq polymerase and deoxynucleotides are required |
| (d) Amplification | 1 billion times in 10 cycles                     |

69. Electrophoresis and Southern blotting techniques are used in

- (a) DNA fingerprinting
- (b) Gene synthesis
- (c) Gene cloning
- (d) All of these

70. PCR technique was discovered by

- (a) Hamilton Smith
- (b) Mullis
- (c) E. Southern
- (d) Milstein

71. Genetic engineering means

- (a) Gene manipulation
- (b) Tissue culture
- (c) Utilization of microbes in industries
- (d) Somatic hybridization

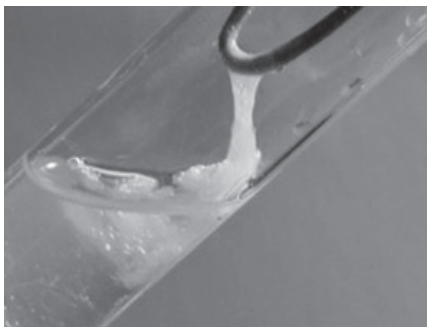
72. Biotechnology helps in synthesizing  
(a) New generation antibiotics (b) New vaccines  
(c) MAB (d) All of these
73. Genetic engineering is possible because of the discovery of  
(a) Transduction (b) Transformation  
(c) Restriction enzyme and DNA ligase (d) Electron microscopy
74. Plasmids are suitable vector for gene cloning because  
(a) They are smaller circular DNA  
(b) They are linear DNA  
(c) They can shuttle between prokaryotes and eukaryotes  
(d) None of the above
75. Bacteria possessing restriction endonuclease enzymes remain  
(a) Affected by bacteriophages (b) Unattacked by bacteriophages  
(c) Resistant to drugs and heat (d) None of these
76. Restriction endonuclease cuts  
(a) dsDNA (b) ssDNA  
(c) Single strand of dsDNA (d) Both (b) and (c)
77. Genes for antibiotic resistance are located on  
(a) Bacterial genome (b) Plasmids  
(c) Mesosomes (d) Plasma membrane
78. Biotechnology reveals the use of  
(a) Microorganisms in industrial processes  
(b) rDNA  
(c) Engineered bacteria for the production of antibiotics and antibodies  
(d) All the above
79. Manipulation in gene has been made possible because of  
(a) Discovery of restriction endonuclease  
(b) Development of method for production of r-DNA  
(c) Discovery of producing desired genes  
(d) All the above
80. Tumour producing plasmid transforms  
(a) Animals (b) Plants (c) Bacteria (d) Fungi
81. The specific DNA sequence in which EcoRI cuts is  
(a) GATTCG (b) GAATTC (c) GTTCAA (d) TTCCAA
82. PCR is related to  
(a) DNA cloning (b) DNA amplification  
(c) DNA selective replication (d) All of these
83. \_\_\_\_\_ is the use of biology in industrial process and improvement of quality of life.  
(a) Genetic engineering (b) Biotechnology  
(c) Eugenics (d) Microbiology
84. T<sub>1</sub> plasmid used in plant genetic engineering is a plasmid of  
(a) Azotobacter (b) Rhizobium (c) Agrobacterium (d) Saccharomyces





93. Electroporation involves
- Promotion of seed germination by induced inhibition of water with electric current.
  - Making transient pores in cell membrane to facilitate entry of gene constructs.
  - Purification of saline water with the help of an artificial membrane.
  - Passage of sucrose through sieve pores by electro-osmosis.
94. Transgenic plants are the ones
- Grown in artificial medium after hybridization in the field.
  - Produced by a somatic embryo in artificial medium.
  - Generated by introducing foreign DNA into a cell and regenerating a plant from the cell.
  - Produced after protoplast fusion in an artificial medium.
95. The enzyme used in PCR technology is
- DNA polymerase
  - Taq polymerase
  - Reverse transcriptase
  - Both (a) and (b)
96. DNA or RNA segment tagged with radioactive molecules is called
- Vector
  - Probe
  - Clone
  - Plasmid
97. Which of the following is a plasmid?
- pBR322
  - BamHI
  - SaII
  - EcoRII
98. In the PCR technology, the DNA segment is replicated over a billion times. This repeated replication is catalyzed by the enzyme
- DNA polymerase
  - Taq polymerase
  - DNA dependent RNA polymerase
  - Primase
99. An antibiotic resistance gene in a vector usually helps in the selection of
- Competent cells
  - Transformed cells
  - Recombinant cells
  - None of these
100. Significance of the 'heat shock' method in bacterial transformation is to facilitate
- Binding of DNA to the cell wall.
  - Uptake of DNA through membrane transport proteins.
  - Uptake of DNA through transient pores in the bacterial cell wall.
  - Expression of antibiotic resistance gene.
101. The role of DNA ligase in the construction of a recombinant DNA molecule is
- Formation of phosphodiester bond between two DNA fragments.
  - Formation of hydrogen bonds between sticky ends of DNA fragments.
  - Ligation of all purine and pyrimidine bases.
  - None of the above
102. Which of the following bacteria is not a source of restriction endonuclease?
- Haemophilus influenzae
  - Escherichia coli
  - Agrobacterium tumefaciens
  - Bacillus amylo
103. Which of the following steps are catalysed by Taq polymerase in a PCR reaction?
- Denaturation of template DNA
  - Annealing of primers to template DNA
  - Extension of primer end on the template DNA
  - All the above

104. A bacterial cell was transformed with a recombinant DNA that was generated using a human gene. However, the transformed cells did not produce the desired protein. Reasons could be
- (a) Human gene may have intron which bacteria cannot process.
  - (b) Amino acid codons for humans and bacteria are different.
  - (c) Human protein is formed but degraded by bacteria.
  - (d) All the above
105. Which of the following should be chosen for best yield if one were to produce a recombinant protein in large amounts?
- (a) Laboratory flask of largest capacity
  - (b) A stirred-tank bioreactor without inlets and outlets
  - (c) A continuous culture system
  - (d) Any of the above
106. Who among the following was awarded the Nobel Prize for the development of PCR technique?
- (a) Herbert Boyer
  - (b) Hargovind Khurana
  - (c) Kary Mullis
  - (d) Arthur Kornberg
107. Which of the following statements does not hold true for restriction enzyme?
- (a) It recognizes a palindromic nucleotide sequence.
  - (b) It is an endonuclease.
  - (c) It is isolated from viruses.
  - (d) It produces the same kind of sticky ends in different DNA molecules.
108. Which process is represented in following diagram?



- (a) PCR
- (b) DNA finger printing
- (c) CTAB
- (d) DNA spooling

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

- 109. Assertion:** Biotechnology deals with techniques of using live organism or enzymes from organisms to produce products and processes useful of humans.  
**Reason:** In vitro fertilization is a part of biotechnology.
- 110. Assertion:** rDNA technology is superior over hybridization.  
**Reason:** rDNA technology allows us to isolate and introduce only one or a set of desirable gene without introducing undesirable genes into the target organism.
- 111. Assertion:** Restriction endonuclease restricts the growth of bacteriophage in bacteria.  
**Reason:** Restriction endonuclease add methyl groups to bacterial DNA.
- 112. Assertion:** In EcoRI, the latter R is derived from the genus of bacteria.  
**Reason:** EcoRI is the name of palindromic nucleotide sequences.
- 113. Assertion:** In rDNA technology, the restriction enzymes, those produce sticky ends are commonly used.  
**Reason:** Sticky ends facilitates the action of enzyme DNA ligase.
- 114. Assertion:** Cloning vector should have selectable marker.  
**Reason:** Selectable marker, helps in identifying and eliminating non-transformants and selectively permitting the growth of transformants.
- 115. Assertion:** Retroviruses in animals have the ability to transform normal cells into cancerous cells.  
**Reason:** Retroviruses have the ability to convert proto oncogenes into oncogenes.
- 116. Assertion:** Micro-injection technique is used to inject rDNA directly into the nucleus of an animal cell.  
**Reason:** Gene-gun is used to transfer rDNA into plant cells.
- 117. Assertion:** In case of PCR the new DNA synthesize on template DNA, one in continuous manner and other in discontinuous manner.  
**Reason:** PCR is an in vivo process.
- 118. Assertion:** In bioreactors the transforming cells are maintained in their physiologically most active log/exponential phase.  
**Reason:** This type of culturing methods produces a larger biomass using higher yields of desired protein.
- 119. Assertion:** Developing a DNA vaccine is a part of biotechnology.  
**Reason:** Biotechnology uses live organism or enzyme form organisms to produce products and processes useful to humans.
- 120. Assertion:** r DNA formation is a part of genetic engineering.  
**Reason:** Genetic engineering include technique to alter chemistry of genetic material
- 121. Assertion:** A sexual reproduction is advantageous over asexual reproduction.  
**Reason:** Sexual reproduction provides opportunities for variation, some of which is beneficial for individual as well as population.
- 122. Assertion:** Alien DNA if linked to plasmid it can be cloned.  
**Reason:** Plasmid contains ORI.
- 123. Assertion:** Restriction endonucleases are also known as molecular scissors.  
**Reason:** It is used to cut DNA (Biomolecules) at specific site.

124. **Assertion:** In PCR T aq polymerase is used.  
**Reason:** T aq is thermo stable DNA polymerase
125. **Assertion:** In electrophoresis DNA is move towards anode.  
**Reason:** DNA is +vely charged molecule.
126. **Assertion:** Selection of recombinants due to inactivation of antibiotics is complicated process.  
**Reason:** It requires simultaneous plating in two plates having different antibiotic.
127. **Assertion:** Ti Plasmid is used as cloning vector.  
**Reason:** It has ability to deliver gene of our interest to variety of plant and it is modified so now no more pathogenic to plant.

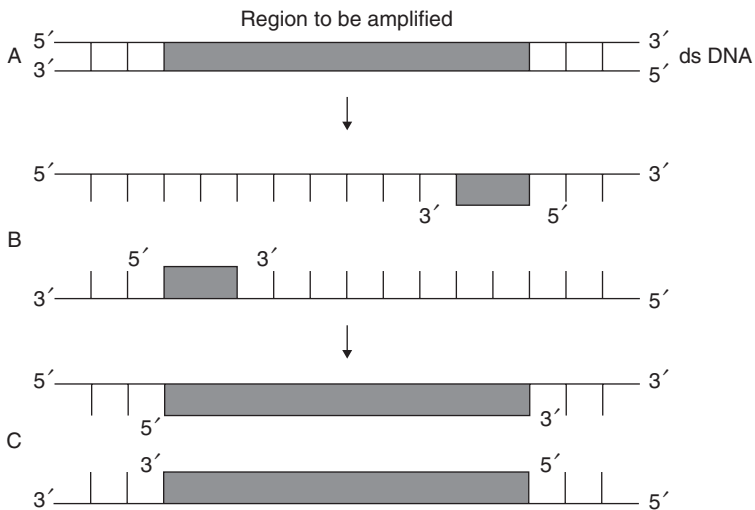
---

### PREVIOUS YEAR QUESTIONS

---

1. Which one of the following is now being commercially produced by biotechnological procedures?  
[AIPMT MAINS 2010]
- (a) Nicotine (b) Morphine  
(c) Quinine (d) Insulin
2. Which of the following are used in gene cloning?  
[AIPMT MAINS 2010]
- (a) Nucleosides (b) Lomasomes  
(c) Mesosomes (d) Plasmids
3. In genetic engineering, a DNA segment (gene) of interest, is transferred to the host cell through a vector. Consider the following four agents (A to D) in this regard and select the correct option about which one or more of these can be used as a vector/ vectors.  
(A) A bacterium  
(B) Plasmid  
(C) Plasmodium  
(D) Bacteriophage  
[AIPMT MAINS 2010]
- (a) (A), (B) and (D) only (b) (A) only  
(c) (A) and (C) only (d) (B) and (D) only
4. Which one of the following palindromic base sequences in DNA can be easily cut at about the middle by some particular restriction enzyme?  
[AIPMT PRE 2010]
- (a) 5'-CGTTCG-3'  
3'-ATGGTA-5'  
(b) 5'-GATATG-3'  
3'-CTACTA-5'  
(c) 5'-GAATTC-3'  
3'-CTTAAG-5'  
(d) 5'-CACGTA-3'  
3'-CTCAGT-5'
5. Restriction endonucleases are enzymes which  
[AIPMT PRE 2010]
- (a) Make cuts at specific positions within the DNA molecule.  
(b) Recognize a specific nucleotide sequence for binding of DNA ligase.

- (c) Restrict the action of the enzyme DNA polymerase.  
(d) Remove nucleotides from the ends of the DNA molecule.
6. Stirred-tank bioreactors have been designed for [AIPMT PRE 2010]
- (a) Addition of preservatives of the product  
(b) Purification of the product  
(c) Ensuring anaerobic conditions in the culture vessel  
(d) Availability of oxygen throughout the process
7. Which one of the following techniques made it possible to genetically engineer living organisms? [AIPMT MAINS 2011]
- (a) Recombinant DNA techniques (b) X-ray diffraction  
(c) Heavier isotope labelling (d) Hybridization
8. Given below is a sample portion of DNA strand giving the base sequence on the opposite strands. What is so special shown in it?  
5' \_GAATTC\_ 3'  
3' \_CTTAAG\_ 5' [AIPMT PRE 2011]
- (a) Deletion mutation (b) Start codon at the 5' end  
(c) Palindromic sequence of base pairs (d) Replication completed
9. There is a restriction endonuclease called EcoRI. What does 'co' part in it stand for? [AIPMT PRE 2011]
- (a) Coelom (b) Coenzyme  
(c) Coli (d) Colon
10. Agarose extracted from sea weeds finds use in [AIPMT PRE 2011]
- (a) Tissue culture (b) PCR  
(c) Gel electrophoresis (d) Spectrophotometry
11. The maximum number of existing transgenic animals is of [AIPMT PRE 2011]
- (a) Mice (b) Cow  
(c) Pig (d) Fish
12. In genetic engineering, the antibiotics are used [AIPMT MAINS 2012]
- (a) To select healthy vectors  
(b) As sequences from where replication starts  
(c) To keep the cultures free of infection  
(d) As selectable markers
13. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents?



[AIPMT MAINS 2012]

**Options:**

- (a) A: Denaturation at a temperature of about 50°C.
- (b) C: Extension in the presence of heat stable DNA polymerase.
- (c) A: Annealing with two sets of primers.
- (d) B: Denaturation at a temperature of about 98°C separating the two DNA strands.

14. Which one of the following represents a palindromic sequence in DNA?

[AIPMT MAINS 2012]

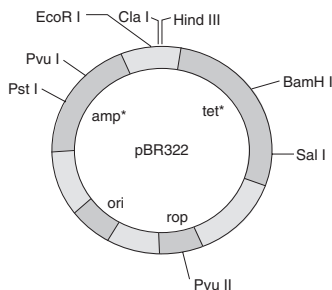
- |                  |                  |
|------------------|------------------|
| (a) 5'-CCAATG-3' | (b) 5'-CATTAG-3' |
| 3'-GAATCC-5'     | 3'-GATAAC-5'     |
| (c) 5'-GATACC-3' | (d) 5'-GAATTC-3' |
| 3'-CCTAAG-5'     | 3'-CTTAAG-5'     |

15. Biolistics (gene-gun) is suitable for

[AIPMT MAINS 2012]

- (a) Transformation of plant cells
- (b) Constructing recombinant DNA by joining with vectors
- (c) DNA finger printing
- (d) Disarming pathogen vectors

16. The figure below is the diagrammatic representation of the E. Coli vector pBR322. Which one of the given options correctly identifies its certain component(s)?



[AIPMT PRE 2012]

- (a) Ori-original restriction enzyme  
(b) Rop-reduced osmotic pressure  
(c) HindIII, EcoRI selectable markers  
(d) amp<sup>R</sup>, tet<sup>R</sup> antibiotic resistance genes
17. Which one is a true statement regarding DNA polymerase used in PCR? [AIPMT PRE 2012]  
(a) It is used to ligate introduced DNA in recipient cells.  
(b) It serves as a selectable marker.  
(c) It is isolated from a virus.  
(d) It remains active at high temperature.
18. For transformation, micro-particles coated with DNA to be bombarded with gene gun are made up of [AIPMT PRE 2012]  
(a) Silver or Platinum  
(b) Platinum or Zinc  
(c) Silicon or Platinum  
(d) Gold or Tungsten
19. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by [AIPMT 2013]  
(a) Centrifugation  
(b) Polymerase chain reaction  
(c) Electrophoresis  
(d) Restriction mapping
20. Which of the following is not correctly matched for the organism and its cell wall degrading enzyme? [AIPMT 2013]  
(a) Bacteria – Lysozyme  
(b) Plant cells – Cellulase  
(c) Algae – Methylase  
(d) Fungi – Chitinase
21. Which vector can clone only a small fragment of DNA? [AIPMT 2014]  
(a) Bacteria artificial chromosome  
(b) Yeast artificial chromosome  
(c) Plasmid  
(d) Cosmid
22. The cutting of DNA at specific locations is possible with the discovery of: [RE-AIPMT 2015]  
(a) Probes  
(b) Selectable markers  
(c) Ligases  
(d) Restriction enzymes
23. The DNA molecule to which the gene of interest is integrated for cloning is called: [RE-AIPMT 2015]  
(a) Vector  
(b) Template  
(c) Carrier  
(d) Transformer
24. Which of the following is not a feature of the plasmids? [NEET - I, 2016]  
(a) Independent replication  
(b) Circular structure  
(c) Transferable  
(d) Single-stranded
25. The taq polymerase enzyme is obtained from: [NEET - I, 2016]  
(a) *Thermus aquaticus*  
(b) *Thiobacillus ferrooxidans*  
(c) *Bacillus subtilis*  
(d) *Pseudomonas putida*

26. Which of the following is a restriction endonuclease? [NEET - I, 2016]  
(a) Hind II (b) Protease  
(c) DNase I (d) RNase
27. Stirred-tank bioreactors have been designed for [NEET - II, 2016]  
(a) Addition of preservatives to the product  
(b) Availability of oxygen throughout the process  
(c) Ensuring anaerobic conditions in the culture vessel  
(d) Purification of product
28. A foreign DNA and plasmid cut by the same restriction end nuclease can be joined to form a recombinant plasmid using [NEET - II, 2016]  
(a) Taq polymerase (b) Polymerase III  
(c) Ligase (d) Eco RI
29. Which of the following is not a component of downstream processing? [NEET - II, 2016]  
(a) Purification (b) Preservation  
(c) Expression (d) Separation
30. Which of the following restriction enzymes produces blunt ends? [NEET - II, 2016]  
(a) Eco RV (b) Xho I  
(c) Hind III (d) Sal I

---

**NCERT EXEMPLAR QUESTIONS**

---

1. Rising of dough is due to  
(a) Multiplication of yeast  
(b) Production of CO<sub>2</sub>  
(c) Emulsification  
(d) Hydrolysis of wheat flour starch into sugars
2. An enzyme catalysing the removal of nucleotides from the ends of DNA is  
(a) Endonuclease (b) Exonuclease  
(c) DNA ligase (d) Hind-II
3. The transfer of genetic material from one bacterium to another through the mediation of a vector like virus is termed as  
(a) Transduction (b) Conjugation (c) Transformation (d) Translation
4. Which of the given statement is correct in the context of observing DNA separated by agarose gel electrophoresis?  
(a) DNA can be seen in visible light.  
(b) DNA can be seen without staining in visible light.  
(c) Ethidium bromide stained DNA can be seen in visible light.  
(d) Ethidium bromide stained DNA can be seen under exposure to UV light.



5. 'Restriction' in restriction enzyme refers to
  - (a) Cleaving of phosphodiester bond in DNA by the enzyme.
  - (b) Cutting of DNA at specific position only.
  - (c) Prevention of the multiplication of bacteriophage in bacteria.
  - (d) All of the above
6. Which of the following is not required in the preparation of recombinant DNA molecule?
  - (a) Restriction endonuclease
  - (b) DNA ligase
  - (c) DNA fragments
  - (d) *E. coli*
7. In agarose gel electrophoresis, DNA molecules are separated on the basis of their
  - (a) Charge only
  - (b) Size only
  - (c) Charge to size ratio
  - (d) Both charge and size
8. The most important feature in a plasmid to be used as a vector is
  - (a) Origin of replication (ori)
  - (b) Presence of a selectable marker
  - (c) Presence of sites for restriction endonuclease
  - (d) Its size
9. While isolating DNA from bacteria, which of the following enzymes is not used?
  - (a) Lysozyme
  - (b) Ribonuclease
  - (c) Deoxyribonuclease
  - (d) Protease
10. Which of the following has popularized the PCR (Polymerase Chain Reactions)?
  - (a) Easy availability of DNA template
  - (b) Availability of synthetic primers
  - (c) Availability of cheap deoxyribonucleotides
  - (d) Availability of 'thermostable' DNA polymerase
11. An antibiotic resistance gene in a vector usually helps in the selection of
  - (a) Competent cells
  - (b) Transformed cells
  - (c) Recombinant cells
  - (d) None of the above
12. Significance of 'heat shock' method in bacterial transformation is to facilitate the
  - (a) Binding of DNA to the cell wall.
  - (b) Uptake of DNA through membrane transport proteins.
  - (c) Uptake of DNA through transient pores in the bacterial cell wall.
  - (d) Expression of antibiotic resistance gene.
13. The role of DNA ligase in the construction of a recombinant DNA molecule is
  - (a) Formation of phosphodiester bond between two DNA fragments.
  - (b) Formation of hydrogen bonds between sticky ends of DNA fragments.
  - (c) Ligation of all purine and pyrimidine bases.
  - (d) None of the above
14. Which of the following is not a source of restriction endonuclease?
  - (a) *Haemophilus influenzae*
  - (b) *Escherichia coli*
  - (c) *Agrobacterium tumefaciens*
  - (d) *Bacillus amyloli*
15. Which of the following steps are catalysed by *Taq* polymerase in a PCR reaction?
  - (a) Denaturation of template DNA
  - (b) Annealing of primers to template DNA

- (c) Extension of primer end on the template DNA  
(d) All of the above
16. A bacterial cell was transformed with a recombinant DNA that was generated using a human gene; however, the transformed cells did not produce the desired protein. The reasons could be  
(a) Human gene may have intron which the bacteria cannot process.  
(b) Amino acid codons for humans and bacteria are different.  
(c) Human protein is formed but degraded by bacteria.  
(d) All of the above
17. Which of the following should be chosen for the best yield if one were to produce a recombinant protein in large amounts?  
(a) Laboratory flask of largest capacity  
(b) A stirred-tank bioreactor without inlets and outlets  
(c) A continuous culture system  
(d) Any of the above
18. Who among the following was awarded the Nobel Prize for the development of PCR technique?  
(a) Herbert Boyer  
(b) Hargovind Khurana  
(c) Kary Mullis  
(d) Arthur Kornberg
19. Which of the following statements does not hold true for restriction enzyme?  
(a) It recognizes a palindromic nucleotide sequence  
(b) It is an endonuclease  
(c) It is isolated from viruses  
(d) It produces the same kind of sticky ends in different DNA molecules

### Answer Keys

#### Practice Questions

1. (d) 2. (a) 3. (d) 4. (d) 5. (d) 6. (d) 7. (b) 8. (d) 9. (d) 10. (b)  
11. (b) 12. (b) 13. (d) 14. (d) 15. (c) 16. (b) 17. (a) 18. (c) 19. (a) 20. (b)  
21. (b) 22. (b) 23. (c) 24. (b) 25. (d) 26. (a) 27. (c) 28. (c) 29. (b) 30. (c)  
31. (d) 32. (d) 33. (b) 34. (b) 35. (b) 36. (a) 37. (a) 38. (d) 39. (c) 40. (c)  
41. (c) 42. (d) 43. (a) 44. (b) 45. (b) 46. (b) 47. (d) 48. (d) 49. (a) 50. (d)  
51. (b) 52. (c) 53. (a) 54. (a) 55. (b) 56. (b) 57. (c) 58. (d) 59. (c) 60. (a)  
61. (c) 62. (b) 63. (b) 64. (c) 65. (b) 66. (d) 67. (c) 68. (c) 69. (a) 70. (b)  
71. (a) 72. (d) 73. (c) 74. (a) 75. (b) 76. (a) 77. (b) 78. (d) 79. (d) 80. (b)  
81. (b) 82. (b) 83. (b) 84. (c) 85. (b) 86. (b) 87. (b) 88. (d) 89. (b) 90. (b)  
91. (a) 92. (d) 93. (b) 94. (c) 95. (d) 96. (b) 97. (a) 98. (b) 99. (b) 100. (c)  
101. (a) 102. (c) 103. (c) 104. (a) 105. (c) 106. (c) 107. (c) 108. (d)

#### Assertion and Reason Questions

109. (b) 110. (a) 111. (c) 112. (d) 113. (a) 114. (a) 115. (a) 116. (b) 117. (d) 118. (a)  
119. (a) 120. (a) 121. (a) 122. (a) 123. (a) 124. (a) 125. (c) 126. (a) 127. (a)

*Previous Year Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d)  | 2. (d)  | 3. (d)  | 4. (c)  | 5. (a)  | 6. (d)  | 7. (a)  | 8. (c)  | 9. (c)  | 10. (c) |
| 11. (a) | 12. (d) | 13. (b) | 14. (d) | 15. (a) | 16. (d) | 17. (d) | 18. (d) | 19. (c) | 20. (c) |
| 21. (c) | 22. (d) | 23. (a) | 24. (d) | 25. (a) | 26. (a) | 27. (b) | 28. (c) | 29. (c) | 30. (a) |

*NCERT Exemplar Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (b)  | 2. (b)  | 3. (a)  | 4. (d)  | 5. (c)  | 6. (d)  | 7. (d)  | 8. (a)  | 9. (c)  | 10. (d) |
| 11. (b) | 12. (c) | 13. (a) | 14. (c) | 15. (c) | 16. (a) | 17. (c) | 18. (c) | 19. (c) |         |

# Biotechnology and Its Application

## PRACTICE QUESTIONS

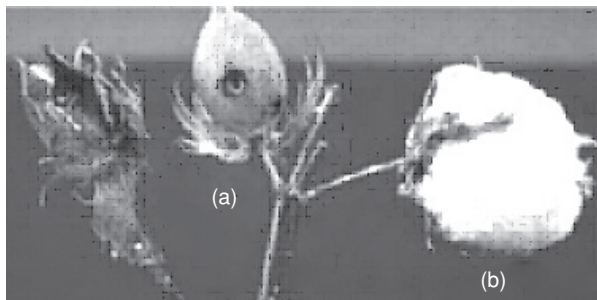
### Biotechnology Application in Agriculture

- Transgenic plants (genetically modified or GM plants) are produced by inserting desired genes in the plasmid of  
(a) E. Coli                      (b) Pseudomonas                      (c) Bacillus subtilis                      (d) Agrobacterium
- The applications of Biotechnology include  
(A) Therapeutics                      (B) Diagnostics  
(C) GM crops for agriculture                      (D) Processed food  
(E) Bioremediation                      (F) Waste treatment  
(G) Energy production  
(a) A, B, C, E only                      (b) C only  
(c) B, C, D, E only                      (d) All of these
- Golden rice is a  
(a) Hybrid                      (b) GM plant                      (c) Transgenic plant                      (d) Both (b) and (c)
- Which of the GMO is used by biotechnology?  
(a) Microbes and fungi                      (b) Plants  
(c) Animals                      (d) All of these
- Humulin is a  
(a) Natural insulin  
(b) Human insulin synthesized by genetically engineered E. coli  
(c) Human insulin synthesized by pancreas  
(d) Chemically synthesized insulin
- Critical research areas of biotechnology are  
(a) Providing the best catalyst in the form of improved organism usually a microbe or pure enzyme.  
(b) Creating optimal condition through engineering for a catalyst to act.  
(c) Downstream processing technologies to purify the protein organic compound.  
(d) All the above
- Salt stress, disease resistance and cold stress in plants can be introduced by  
(a) Genetic engineering                      (b) Tissue culture  
(c) Hybridoma technology                      (d) None of these

8. Food production can be increased by
  - (a) Agro chemical based agriculture
  - (b) Organic agriculture
  - (c) Genetically engineered based agriculture
  - (d) All of these
9. DNA fingerprinting was developed by
  - (a) Prof. Alec Jeffrey
  - (b) Arber and Smith
  - (c) Barbara McClintock
  - (d) Jacob and Monod
10. After Green Revolution how many times does food supply has been increased?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
11. Genetic engineering is useful for
  - (a) Agriculture
  - (b) Medical research
  - (c) Treatment and diagnosis of diseases
  - (d) All of these
12. Increased yield in Green Revolution is mainly due to
  - (a) Use of agrochemicals (fertilizers and pesticides)
  - (b) Use of improved crop varieties
  - (c) Use of GM crops
  - (d) All of these
13. DNA fingerprinting needs
  - (a) Suitable restriction enzyme
  - (b) DNA probe
  - (c) Facilities for gel electrophoresis and southern blotting
  - (d) All the above
14. The following are the advantages of GM crops except
  - (a) They reduce reliance on chemical pesticides
  - (b) Increase efficiency of mineral usage
  - (c) Enhanced nutritional value of food
  - (d) Post harvest losses are more
15. Bt stands for
  - (a) Bacterial toxin
  - (b) Botulinum toxin
  - (c) Bacillus thuringiensis
  - (d) Bacillus toxin
16. Which of the following crops are now genetically modified by Bt-toxin gene?
  - (A) Cotton
  - (B) Corn
  - (C) Rice
  - (D) Tomato
  - (E) Potato
  - (F) Soyabean
  - (a) A, B and C only
  - (b) D and E only
  - (c) A and F only
  - (d) All of these
17. During electrophoresis, DNA fragments move towards the
  - (a) Anode
  - (b) Cathode
  - (c) Both the poles
  - (d) None of these
18. Some strains of Bacillus thuringiensis produce proteins that kill certain insects like
  - (a) Lepidopterans
  - (b) Coleopterans
  - (c) Dipterans
  - (d) All of these
19. Humulin was first marketed by
  - (a) Eli Lilly
  - (b) Sun pharma
  - (c) Nova Industry
  - (d) May and Baker



31. Golden rice is enriched in  
 (a) Beta carotene (b) Lysine (c) Vitamin C (d) Iron
32. Bt-toxin is obtained from  
 (a) Bacilli (b) Cocci (c) Vibrio (d) Spirillum
33. Engineered bacteria have successfully been used for the commercial production of  
 (a) Human insulin (b) Melatonin (c) Thyrosine (d) Testosterone
34. A nematode \_\_\_\_\_ infects the roots of tobacco plants and causes great reduction in yield.  
 (a) Ancylostoma (b) Hookworm  
 (c) Meloidogyne incognita (d) Wuchereria
35. The first transgenic crop plant was  
 (a) Cotton (b) Cereals (c) Tobacco (d) Pea
36. RNAi process takes place in  
 (a) Prokaryotes (b) Unicellular eukaryotes only  
 (c) Multicellular eukaryote only (d) All eukaryotes
37. Which of the following cuts the DNA at a specific place?  
 (a) Restriction endonuclease (b) DNA ligase  
 (c) Exonuclease (d) Alkaline phosphatase
38. Which of the following is true about RNAi process?  
 (a) It is a method of cellular defense.  
 (b) It involves silencing of a specific mRNA due to a complementary dsRNA molecule.  
 (c) Source of complementary RNA in this process may be infection by viruses having RNA genomes.  
 (d) All are true
39. The most commonly used bacterium in plant genetic engineering is  
 (a) E. coli (b) Rhizobium  
 (c) Klebsiella (d) Agrobacterium
40. Identify A and B in the diagram.



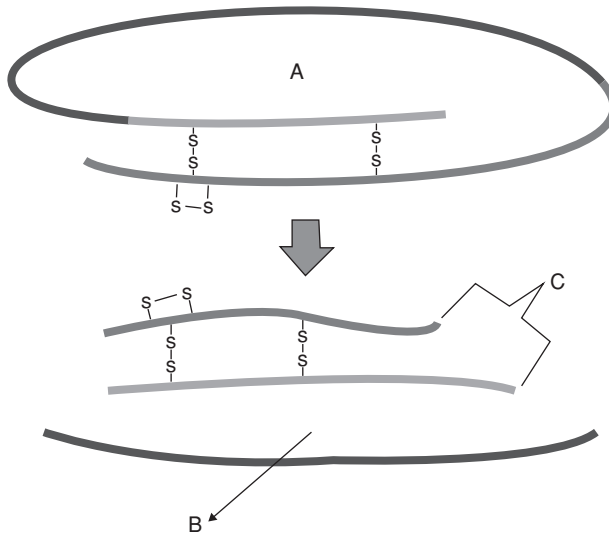
- (a) A: A fully mature cotton boll, B: Destroyed by bollworms  
 (b) A: Destroyed by bollworms, B: Fully mature cotton boll  
 (c) A: Destroyed by virus, B: Immature cotton boll  
 (d) A: Immature normal cotton boll, B: Destroyed by virus

41. In which of the processes is both the DNA strands transcribed?  
(a) PCR (b) DNA replication  
(c) RNAi (d) Southern blotting
42. The source of Taq polymerase used in PCR technique is a  
(a) Thermophilic fungus (b) Mesophilic fungus  
(c) Thermophilic bacteria (d) Halophilic bacteria
43. Which of the following vector is used to transfer nematode specific gene in host plant?  
(a) Virus (b) Rhizobium  
(c) Agrobacterium (d) Cosmid
44. What is true about Bt-toxin?  
(a) The concerned bacillus has antitoxins.  
(b) The inactive protoxin gets converted into active form in the insect gut.  
(c) Bt-protein exists as active toxin in the bacillus.  
(d) The activated toxin enters the ovary of pest to sterilize it and thus prevent its multiplication.
45. RNAi stands for  
(a) RNA infection (b) RNA induction  
(c) RNA interference (d) RNA inhibition
46. The abbreviation 'B' in Bt-toxin stands for  
(a) Biotechnology  
(b) Biotoxin  
(c) Bacillus  
(d) Toxin released by bacterium
47. Which of the following is the source of complementary strand in mRNA silencing?  
(a) An infection by viruses having RNA genome  
(b) Mobile genetic elements (Transposons)  
(c) Both (a) and (b)  
(d) Proteins
48. Some of the characteristics of Bt-cotton are  
(a) Long fibre and resistance of aphids.  
(b) Maximum yield, long fibre and resistance to beetle pests.  
(c) High yield and production of toxin protein crystal which kills dipteran pests only.  
(d) High yield and resistance to bollworms.
49. How many recombinant therapeutics have been approved for human use all over the world?  
(a) 10 (b) 20 (c) 30 (d) 90
50. Which of the following is produced by genetically engineered bacterium?  
(a) Tyrosine (b) Insulin (c) Glycogen (d) ADH
51. How many recombinant products are presently being marketed in India?  
(a) 10 (b) 20 (c) 12 (d) 30
52. Which of the following is not used as a bioweapon?  
(a) Bacillus anthracis (b) Botulinum toxin  
(c) Bacillus thuringiensis (d) Small pox



53. The main challenge for the production of insulin using rDNA technique is
- Production of A peptide
  - Production of B peptide
  - Getting insulin assembled into a mature form
  - All the above
54. Transgenic plants are produced by
- Inducing gene mutation
  - Arresting spindle fibre formation
  - Deleting sex chromosome
  - Introducing foreign genes
55. Peptide A and peptide B is linked by how many disulphide linkages between their proinsulin?
- 1
  - 2
  - 3
  - 4
56. Some of the steps involved in the production of humulin are given below. Choose the correct sequence.
- Purification of humulin.
  - Extraction of recombinant gene product from *E. coli*.
  - Culturing recombinant *E. coli* in bioreactors.
  - Introduction of recombinant plasmid into *E. coli*.
  - Synthesis of gene for human insulin artificially.
  - Insertion of human insulin gene into plasmid.
- 2, 1, 4, 3, 5, 6
  - 1, 3, 5, 6, 2, 4
  - 5, 6, 4, 3, 2, 1
  - 3, 5, 2, 1, 6, 4
57. Which American company in 1983 prepared humulin?
- Eli Lilly
  - Ranbaxy
  - Sun pharma
  - Glaxosmithkline
58. During the process of prohormone 'proinsulin' into mature insulin synthesis
- C-peptide is added to proinsulin
  - C-peptide is removed from proinsulin
  - $\beta$ -peptide is added to proinsulin
  - $\beta$ -peptide is removed from proinsulin
59. Select the true statements from the following.
- Insulin from animal source, may develop allergy in some patients.
  - C-peptide is not present in mature insulin.
  - Recombinant therapeutics do not induce unwanted immunological response.
  - Insulin can be administered orally to diabetic patients
- 1 and 3 only
  - 1 and 2 only
  - 3 and 4 only
  - 1, 2 and 3 only
60. Cancer is generally caused due to the activation/conversion of \_\_\_\_\_ to \_\_\_\_\_ and/or inactivation of \_\_\_\_\_.
- Oncogene, tumour suppressor gene, proto-oncogene
  - Tumour suppressor gene, oncogene, proto-oncogene
  - Proto-oncogene, oncogene, tumour suppressor gene
  - Oncogene, proto-oncogene, tumour suppressor gene
61. Which of the following peptide chain is removed during maturation of pro-insulin into insulin?
- A-peptide
  - B-peptide
  - C-peptide
  - B and C peptide

62. The Bt-toxin is not toxic to human beings because
- The pro Bt-toxin inactivation requires above human body temperature.
  - The Bt-toxin recognizes only insect specific target.
  - The Bt-toxin formation from pro Bt-toxin requires pH lower than that present in the human stomach.
  - Conversion of pro Bt-toxin to Bt-toxin takes place only in highly alkaline conditions.
63. Which part of the diagram shows that insulin in our body is synthesized in immature form?



- A and C
  - B and C
  - A and B
  - None of these
64. Why is insulin not administered orally to diabetic patients?
- Insulin is bitter in taste.
  - Insulin is a peptide.
  - Insulin will lead to sudden decrease in blood sugar if given orally.
  - Insulin leads to peptic ulcer if given orally.
65. The method of DNA fingerprinting involves the use of
- Restriction enzyme
  - Taq polymerase
  - Oligonucleotide primers
  - All of these
66. Pro-insulin contains
- A-peptide
  - B-peptide
  - C-peptide
  - All of these
67. What is the source of  $T_i$  plasmid which is modified and used as a cloning vector to deliver the desired genes into plant cells?
- Agrobacterium tumefaciens
  - Thermophilus aquaticus
  - Pyrococcus furiosus
  - Aedes aegypti

68. The first clinical gene therapy was given in  
(a) 1992 (b) 1990  
(c) 1995 (d) 1997
69. The thermostable enzyme 'Taq' and 'Pfu' isolated from thermophilic bacteria are  
(a) RNA polymerase (b) DNA polymerase  
(c) Restriction endonuclease (d) DNA ligase
70. Select the incorrect matching.  
(a) ADA → Adenosine Aminase  
(b) ELISA → Enzyme Linked Immunosorbent Assay  
(c) PCR → Polymers Chain Reaction  
(d) PKU → Phenyl Ketonuria
71. The term 'molecular scissor' generally refers to  
(a) DNA polymerase (b) RNA polymerase  
(c) Restriction endonuclease (d) DNA ligase
72. ADA deficiency is due to  
(a) Insertion of gene (b) Deletion of gene  
(c) Duplication of gene (d) Translocation of gene
73. Permanent cure for ADA deficiency is  
(a) Genetically engineered lymphocyte  
(b) Bone marrow transplantation  
(c) Enzyme replacement therapy  
(d) ADA gene introduced in early embryonic stages
74. The first clinical gene therapy was given to a \_\_\_\_\_ old girl.  
(a) 2 year (b) 6 year  
(c) 4 year (d) 8 year
75. The conventional method of diagnosis involves  
(a) Urine analysis (b) ELISA  
(c) PCR (d) rDNA technology
76. PCR is used in the detection of  
(a) HIV (AIDS) (b) Cancer  
(c) Genetic disorder (d) All of these
77. When a patient with defective ADA is treated, which of the following steps are performed for gene therapy?  
(A) Lymphocytes are obtained from the patients.  
(B) Lymphocytes are transferred to culture dishes.  
(C) Lymphocytes are transected with normal ADA genes.  
(D) The transected cells are returned to the patients.  
(a) All the above (b) Only C and D  
(c) Only D (d) SCID cannot be treated
78. Which of the following is a benefit to have insulin produced by biotechnology?  
(a) It is just as effective and is less expensive (b) It can be produced in large quantity  
(c) It is non allergic (d) All of these

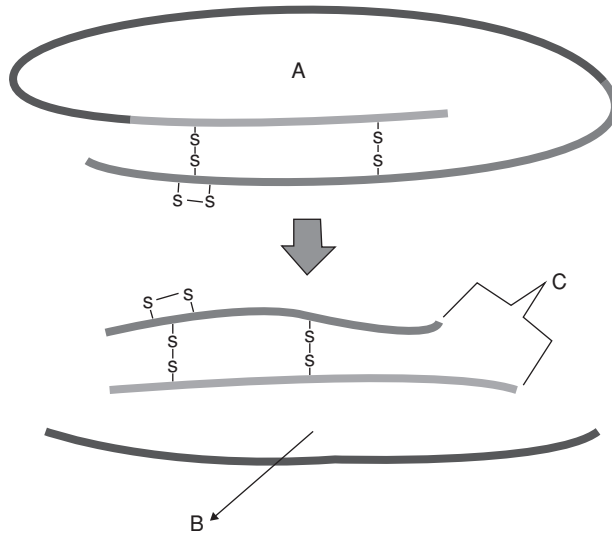
79. Which one of the following genes is defective in patients suffering from severe combined immunodeficiency syndrome (SCID)?  
 (a) RNAase (b) ADA  
 (c) Carbonic anhydrase (d) DNAase
80. A functional ADA cDNA can be introduced into cells of the patients receiving gene therapy by using vector constituted by  
 (a) E. coli (b) Reovirus  
 (c) Retrovirus (d) Agrobacterium
81. Which of the following is used as probe?  
 (a) Single stranded DNA  
 (b) dsDNA tagged with a radioactive molecule  
 (c) Single stranded RNA tagged with a radioactive molecule  
 (d) dsRNA
82. Which gene does not appear in photographic film in autoradiography?  
 (a) Housekeeping gene (b) Structural gene  
 (c) Mutated gene (d) Transcriptionally active gene
83. Which of the following is based on antigen-antibody reaction?  
 (a) PCR (b) ELISA  
 (c) Serum analysis (d) Southern blotting
84. Which of the following can be detected in ELISA?  
 (a) Protein antigen (b) Glycoprotein antigen  
 (c) Antibodies synthesized against pathogen (d) Any of these
85. Over 95 per cent of all existing transgenic animals are  
 (a) Pig (b) Mice  
 (c) Sheep (d) Cow
86. Transgenic organisms are used  
 (a) To study disease (b) To produce biological product  
 (c) To test vaccine safety (d) All of these
87. Match the columns

| Column-I     | Column-II                                             |
|--------------|-------------------------------------------------------|
| A. Emphysema | 1. Test to detect antigen or antibody                 |
| B. Rosie     | 2. $\alpha$ -1 antitrypsin                            |
| C. ELISA     | 3. Protein enriched milk                              |
| D. ROP       | 4. Codes for proteins involved in plasmid replication |

- (a) A-2, B-3, C-1, D-4 (b) A-1, B-3, C-4, D-2  
 (c) A-1, B-2, C-3, D-4 (d) A-4, B-3, C-2, D-1
88. Transgenic animals are prepared for the following disease analysis except  
 (a) Cancer (b) Cystic fibrosis and Alzheimer's  
 (c) Rheumatoid arthritis (d) AIDS

89. 'Rosie' a transgenic cow known to produce a type of milk which has all the following characteristics except
- (a) Protein content of 2.4 gm/litre
  - (b) Has human  $\alpha$ -lactalbumin
  - (c) More balance diet than normal milk for babies
  - (d) Rich in cholesterol
90. Rosie was produced in the year
- (a) 2000
  - (b) 1999
  - (c) 1997
  - (d) 2007
91. GMO/transgenic animal are used in testing safety of polio vaccine before they are used on human?
- (a) Transgenic sheep
  - (b) Transgenic cow
  - (c) Transgenic viruses
  - (d) Transgenic mice
92. How many varieties of rice have been estimated to be present in India?
- (a) 200
  - (b) 20,000
  - (c) 200,000
  - (d) 2,000,000
93. The use of bioresources by multinational companies and other organizations, without proper authorization from the countries and people concerned without compensatory payment, is called
- (a) Bioethics
  - (b) Biopiracy
  - (c) Bioterror
  - (d) Bioweapon
94. Which variety of rice was patented by a US company even though the highest number of varieties of this rice is found in India?
- (a) Sharbati Sonora
  - (b) Co-667
  - (c) Basmati
  - (d) Lerma Roja
95. The Government of India took what step to cater to the requirement of patent terms and other emergency provisions with regard to biopiracy?
- (a) Biopiracy act
  - (b) India Patents Bill
  - (c) RTI Act
  - (d) Negotiable Instruments Act
96. Which Indian plants have either been patented or attempts have been made to patent them by western nations for their commercial use?
- (a) Basmati rice
  - (b) Turmeric
  - (c) Neem
  - (d) All of these have been targeted
97. Golden rice is
- (a) A variety of rice grown along the yellow river in China.
  - (b) Long stored rice having yellow colour tint.
  - (c) A transgenic rice having gene for  $\beta$ -carotene.
  - (d) Wild variety of rice with yellow coloured grains.
98. In RNAi, genes are silenced using
- (a) ssDNA
  - (b) dsDNA
  - (c) dsRNA
  - (d) ssRNA
99. The first clinical gene therapy was done for the treatment of
- (a) AIDS
  - (b) Cancer
  - (c) Cystic fibrosis
  - (d) SCID (Severe Combined Immuno Deficiency resulting from the deficiency of ADA)

100. ADA is an enzyme which is deficient in the genetic disorder SCID. What is the full form of ADA?
- (a) Adenosine deoxyaminase (b) Adenosine deaminase  
(c) Aspartate deaminase (d) Arginine dearginase
101. Silencing of a gene could be achieved through the use of
- (a) Short interfering RNA (RNAi) (b) Antisense RNA  
(c) By both (d) None of these



102. Identify A, B and C in the diagram.
- (a) A Proinsulin, B Free C peptide, C Insulin  
(b) A Free C peptide, B Proinsulin, C Insulin  
(c) A Insulin, B Proinsulin, C Free C peptide  
(d) A Free C peptide, B Insulin, D Proinsulin
103. Crystals of Bt-toxin produced by some bacteria do not kill the bacteria themselves because
- (a) Bacteria are resistant to the toxin  
(b) Toxin is immature  
(c) Toxin is inactive  
(d) Bacteria encloses toxin in a special sac

**ASSERTION AND REASON QUESTIONS**

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.  
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.  
(c) If the assertion is true but the reason is false.  
(d) If both the assertion and reason are false.

- 104. Assertion:** ELISA is used to detect infection by pathogen, that can be detected by the presence of antigens or by detecting the antibodies synthesized against the pathogen.  
**Reason:** ELISA is based on the principle of antigen-antibody interaction.
- 105. Assertion:** GEAC is genetic engineering approval committee.  
**Reason:** GEAC will make decisions regarding the validity of GM research.
- 106. Assertion:** rDNA therapeutic are better than similar products isolated from non-human sources.  
**Reason:** rDNA therapeutic do not induce unwanted immunological responses.
- 107. Assertion:** Alpha - 1 – antitrypsin is used to treat emphysema.  
**Reason:** Transgenic mice are being used to test the safety of the polio vaccine.
- 108. Assertion:** PCR and ELISA are techniques that serve the purpose of easily diagnosis.  
**Reason:** For the treatment of a disease, early diagnosis is very important.
- 109. Assertion:** Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organizations without proper authorization from the countries and people concerned without compensatory payment.  
**Reason:** Bioprospecting is the process of discovery and commercialization of new products based on biological resources.
- 110. Assertion:** ADA deficiency can be cured by bone marrow transplantation.  
**Reason:** ADA deficiency can be treated by enzyme replacement therapy.
- 111. Assertion:** Bt toxin do not kill bacillus.  
**Reason:** Bt toxin protein exists in bacillus as inactive prototoxins.
- 112. Assertion:** RNAi takes place in all eukaryotic organism as a method of cellular defence.  
**Reason:** RNAi method involve silencing of a specific mRNA due to complementary dsRNA molecule that binds to and prevent translation of the mRNA (silencing).
- 113. Assertion:** Genetic modification will enhance nutritional value of food.  
**Reason:** Vitamin A enriched rice is GMO.
- 114. Assertion:** GM plants are useful to us.  
**Reason:** We have introduced many useful characters in GM plants like resistance to abiotic stress, enhanced nutritional value of food.
- 115. Assertion:** Bt toxin is produced by fungus *Bacillus thuringiensis*.  
**Reason:** Bt toxin is polysaccharide.
- 116. Assertion:** serum and urine analysis is not sensitive methods of diagnosis  
**Reason:** Early detection of pathogen is not possible by these methods.
- 117. Assertion:** PCR is now routinely used to detect HIV in suspected AIDS patient.  
**Reason:** Very low concentration of Virus can be detected by the amplification of the nucleic acid by PCR
- 118. Assertion:** Transgenic animals are made that carry genes which makes them more sensitive to toxic substances than non transgenic animals.  
**Reason:** Toxicity testing in such animals will allow us to obtain result in less time.

119. **Assertion:** ELISA is used to detect antigen or antibody.  
**Reason:** ELISA is a method of molecular diagnosis based on antigen- antibody reaction.
120. **Assertion:** A double stranded DNA or RNA tagged with radioactive molecule is used as probe.  
**Reason:** Because double stranded DNA or RNA is easily hybridised with single stranded DNA.
121. **Assertion:** Why oral insulin is not administered to diabetic people.  
**Reason:** Insulin is digested by our digestive enzymes.
122. **Assertion:** A functional ADA c DNA is introduced in lymphocyte using retroviral vector.  
**Reason:** Disarmed retrovirus is use to deliver gene in animal cells.

---

### PREVIOUS YEAR QUESTIONS

---

1. Which one of the following is used as vector for cloning genes into higher organisms?  
[AIPMT PRE 2010]
- (a) Baculovirus (b) Salmonella typhimurium  
(c) Rhizopus nigricans (d) Retrovirus
2. DNA or RNA segment tagged with a radioactive molecule is called  
[AIPMT PRE 2010]
- (a) Vector (b) Probe  
(c) Clone (d) Plasmid
3. Genetic engineering has been successfully used for producing  
[AIPMT PRE 2010]
- (a) Transgenic mice for testing safety of polio vaccine before used in humans.  
(b) Transgenic models for studying new treatments for certain cardiac diseases.  
(c) Transgenic cow Rosie which produces high fat milk for making ghee.  
(d) Animals like bulls for farm work as they have super power.
4. Some of the characteristics of Bt cotton are  
[AIPMT PRE 2010]
- (a) Long fibre and resistance to aphids.  
(b) Medium yield, long fibre and resistance to beetle pests.  
(c) High yield and production of toxic protein crystals which kill dipteran pests.  
(d) High yield and resistance to bollworms.
5. Bacillus thuringiensis forms protein crystals which contain insecticidal protein. This protein  
[AIPMT MAINS 2011]
- (a) Binds with epithelial cells of midgut of the insect pest ultimately killing it.  
(b) Is coded by several genes including the gene cry.  
(c) Is activated by acid pH of the foregut of the insect pest.  
(d) Does not kill the carrier bacterium which is itself resistant to this toxin.
6. Silencing of mRNA has been used in producing transgenic plants resistant to  
[AIPMT MAINS 2011]



- (a) Bollworms (b) Nematodes  
(c) White rusts (d) Bacterial blights
7. Read the following four statements (A to D) about certain mistakes in two of them.  
(A) The first transgenic buffalo, Rosie produced milk which was human alpha-lactalbumin enriched.  
(B) Restriction enzymes are used in isolation of DNA from other macromolecules.  
(C) Downstream processing is one of the steps of rDNA technology.  
(D) Disarmed pathogen vectors are also used in transfer of rDNA into the host.  
[AIPMT MAINS 2011]
- Which of the two statements have mistakes?  
(a) B and C (b) C and D (c) A and C (d) A and B
8. The process of RNA interference has been used in the development of plants resistant to  
[AIPMT PRE 2011]  
(a) Fungi (b) Viruses (c) Insects (d) Nematodes
9. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells)  
[AIPMT MAINS 2012]  
(a) A particular hormone (b) An antioxidant  
(c) A toxic protein (d) Both sense and anti-sense RNA
10. Which of the following Bt crops is being grown in India by the farmers?  
[AIPMT 2013]  
(a) Maize (b) Cotton (c) Brinjal (d) Soybean
11. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of  
[AIPMT 2013]  
(a) Non-recombinant bacteria containing  $\beta$ -galactosidase.  
(b) Insertional inactivation of  $\alpha$ -galactosidase in non-recombinant bacteria.  
(c) Insertional inactivation of  $\alpha$ -galactosidase in recombinant bacteria.  
(d) Inactivation of glycosidase enzyme in recombinant bacteria.
12. Which of the following Bt crops is being grown in India by the farmers?  
[AIPMT 2013]  
(a) Maize (b) Cotton  
(c) Brinjal (d) Soybean
13. The first human hormone produced by recombinant DNA technology is  
[AIPMT 2014]  
(a) Insulin (b) Oestrogen  
(c) Thyroxin (d) Progesterone
14. Which body of the Government of India regulates GM research and safety of introducing GM organism for public services?  
[AIPMT 2015]  
(a) Bio-safety committee  
(b) Indian Council of Agricultural Research

- (c) Genetic Engineering Approval Committee  
(d) Research Committee on Genetic manipulation
15. In Bt cotton the Bt toxin present in plant tissue as pro-toxin is converted into active toxin due to  
[AIPMT 2015]
- (a) Alkaline pH of the insect gut  
(b) Acidic pH of the insect gut  
(c) Action of gut microorganisms  
(d) Presence of conversion factors in insect gut
16. The crops engineered for glyphosate are resistant/tolerant to  
[AIPMT 2015]
- (a) Fungi (b) Bacteria  
(c) Insects (d) Herbicides
17. The introduction of tDNA into plants involves  
[RE-AIPMT 2015]
- (a) Altering the pH of soil, then heat-shocking the plants.  
(b) Exposing the plants to cold for a brief period.  
(c) Allowing the plant roots to stand in water.  
(d) Infection of the plant by *Agrobacterium tumefaciens*.
18. The two polypeptides of human insulin are linked together by:
- (a) Hydrogen bonds (b) Phosphodiester bond  
(c) Covalent bond (d) Disulphide bridges
19. Which part of the tobacco plant is infected by *Meloidogyne incognita*?
- (a) Flower (b) Leaf  
(c) Stem (d) Root
20. Which kind of therapy was given in 1990 to a four-year-old girl with adenosine deaminase (ADA) deficiency?
- (a) Chemotherapy (b) Immunotherapy  
(c) Radiation therapy (d) Gene therapy

---

**NCERT EXEMPLAR QUESTIONS**

---

1. Bt cotton is not
- (a) A GM plant  
(b) Insect resistant  
(c) A bacterial gene expressing system  
(d) Resistant to all pesticides
2. C-peptide of human insulin is
- (a) A part of mature insulin molecule.  
(b) Responsible for the formation of disulphide bridges.  
(c) Removed during the maturation of pro-insulin to insulin.  
(d) Responsible for its biological activity.

3. GEAC stands for
  - (a) Genome Engineering Action Committee
  - (b) Ground Environment Action Committee
  - (c) Genetic Engineering Approval Committee
  - (d) Genetic and Environment Approval Committee
4.  $\alpha$ -1 antitrypsin is
  - (a) An antacid
  - (b) An enzyme
  - (c) Used to treat arthritis
  - (d) Used to treat emphysema
5. A probe which is a molecule is used to locate specific sequences in a mixture of DNA or RNA molecules, it could be
  - (a) A single stranded RNA
  - (b) A single stranded DNA
  - (c) Either RNA or DNA
  - (d) Can be ssDNA but not ssRNA
6. Choose the correct option regarding Retrovirus:
  - (a) An RNA virus that can synthesize DNA during infection
  - (b) A DNA virus that can synthesize RNA during infection
  - (c) An ssDNA virus
  - (d) A dsRNA virus
7. The site of production of ADA in the body is
  - (a) Erythrocytes
  - (b) Lymphocytes
  - (c) Blood plasma
  - (d) Osteocytes
8. A protoxin is
  - (a) A primitive toxin
  - (b) A denatured toxin
  - (c) Toxin produced by protozoa
  - (d) Inactive toxin
9. Pathophysiology is the
  - (a) Study of physiology of pathogen
  - (b) Study of normal physiology of host
  - (c) Study of altered physiology of host
  - (d) None of the above
10. The trigger for activation of toxin *Bacillus thuringiensis* is
  - (a) Acidic pH of stomach
  - (b) High temperature
  - (c) Alkaline pH of gut
  - (d) Mechanical action in the insect gut
11. Golden rice is
  - (a) A variety of rice grown along the yellow river in China
  - (b) Long stored rice having yellow colour tint
  - (c) A transgenic rice having gene for b-carotene
  - (d) Wild variety of rice with yellow coloured grains
12. In RNAi, the genes are silenced using
  - (a) ssDNA
  - (b) dsDNA
  - (c) dsRNA
  - (d) ssRNA
13. The first clinical gene therapy was done for the treatment of
  - (a) AIDS
  - (b) Cancer
  - (c) Cystic fibrosis
  - (d) SCID (Severe Combined Immunodeficiency resulting from the deficiency of ADA)

14. ADA is an enzyme which is deficient in a genetic disorder SCID. What is the full form of ADA?  
(a) Adenosine deoxy aminase (b) Adenosine deaminase  
(c) Aspartate deaminase (d) Arginine deaminase
15. Silencing of a gene could be achieved through the use of  
(a) RNAi only (b) Antisense RNA only  
(c) By both (d) None of the above

### Answer Keys

#### Practice Questions

1. (d) 2. (d) 3. (d) 4. (d) 5. (b) 6. (d) 7. (a) 8. (d) 9. (a) 10. (b)  
11. (d) 12. (a) 13. (d) 14. (d) 15. (c) 16. (d) 17. (a) 18. (d) 19. (a) 20. (a)  
21. (b) 22. (a) 23. (c) 24. (a) 25. (c) 26. (c) 27. (c) 28. (d) 29. (d) 30. (c)  
31. (a) 32. (a) 33. (a) 34. (c) 35. (c) 36. (d) 37. (a) 38. (d) 39. (d) 40. (b)  
41. (c) 42. (c) 43. (c) 44. (b) 45. (c) 46. (c) 47. (c) 48. (d) 49. (c) 50. (b)  
51. (c) 52. (c) 53. (c) 54. (d) 55. (b) 56. (c) 57. (a) 58. (b) 59. (d) 60. (c)  
61. (c) 62. (d) 63. (c) 64. (b) 65. (a) 66. (d) 67. (a) 68. (b) 69. (b) 70. (a)  
71. (c) 72. (b) 73. (d) 74. (c) 75. (a) 76. (d) 77. (a) 78. (d) 79. (b) 80. (c)  
81. (c) 82. (c) 83. (b) 84. (d) 85. (b) 86. (d) 87. (a) 88. (d) 89. (d) 90. (c)  
91. (d) 92. (c) 93. (b) 94. (c) 95. (b) 96. (d) 97. (c) 98. (c) 99. (d) 100. (b)  
101. (c) 102. (a) 103. (c)

#### Assertion and Reason Questions

104. (a) 105. (b) 106. (a) 107. (b) 108. (b) 109. (b) 110. (b) 111. (a) 112. (b) 113. (b)  
114. (a) 115. (d) 116. (a) 117. (a) 118. (a) 119. (a) 120. (d) 121. (a) 122. (a)

#### Previous Year Questions

1. (d) 2. (b) 3. (a) 4. (d) 5. (a) 6. (b) 7. (d) 8. (d) 9. (d) 10. (b)  
11. (a) 12. (b) 13. (a) 14. (c) 15. (a) 16. (d) 17. (d) 18. (d) 19. (d) 20. (d)

#### NCERT Exemplar Questions

1. (d) 2. (c) 3. (c) 4. (d) 5. (c) 6. (a) 7. (b) 8. (d) 9. (c) 10. (c)  
11. (c) 12. (c) 13. (d) 14. (b) 15. (c)



# Ecology

**Chapter 13:** Organisms and Populations

**Chapter 14:** Ecosystem

**Chapter 15:** Biodiversity and Conservation

**Chapter 16:** Environmental Issues

## Students Note

This unit comprises four chapters—Organisms and Populations, Ecosystem, Biodiversity and Conservation and Environmental Issues. Again, diagrams and Pi-charts are very significant. In the chapter on Ecosystem, dates are very important. All graph and pyramids are also significant and should be carefully appraised. While reading this unit, it is advisable to remember that it's nature's rule and as we are an integral part of the nature, these rules are applicable to us. This mode of thought makes ecology a very interesting topic.

*This page is intentionally left blank.*

# Organisms and Populations

## PRACTICE QUESTIONS

### Organism and its Environment

- \_\_\_\_\_ is revered as the Father of Ecology in India.  
(a) Verghese Kurein (b) Amartya Sen  
(c) Ramdeo Misra (d) Hargobind Khurana
- Ecology is a subject which studies the interactions among organisms and \_\_\_\_\_.  
(a) Amongst the organism and its chemical environment.  
(b) Between the organism and its physical environment.  
(c) Amongst the organism and its habitat.  
(d) Between the organism and its biosphere.
- Basically, ecology is concerned with how many levels of biological organizations?  
(a) 3 (b) 4 (c) 5 (d) 7
- The levels of biological organization in ecology are  
(a) Cell, Organism, Community, Biosphere  
(b) Organisms, Family, Communities, Biomes  
(c) Species, Populations, Communities, Biomes  
(d) Organisms, Populations, Communities, Biomes
- Ecology at the level of an individual organism is \_\_\_\_\_.  
(a) Systemic ecology (b) Somatic ecology  
(c) Physiological ecology (d) Physical ecology
- Which important life process is considered at organism level of ecology?  
(a) Respiration (b) Immunity  
(c) Reproduction (d) Homeostasis
- How does seasonal variations take place on earth?  
(a) Rotation on its own axis (b) Rotation around sun  
(c) Rotation of moon around earth (d) Both (a) and (b)
- The factors responsible for causing annual variation in the intensity and duration of temperature are \_\_\_\_\_.  
(a) Rotation of earth in solar system (b) Rotation of earth around sun  
(c) Tilt in axis of earth (d) Both (b) and (c)
- Precipitation due to annual variation in seasons includes  
(a) Rain (b) Snow (c) Dew (d) Both (a) and (b)



10. Precipitation is an important factor for the formation of major biomes such as  
(a) Rain forest (b) Tundra  
(c) Desert (d) All the above
11. **A:** Regional and local variations occur with each habitat.  
**B:** It causes formation of a wide variety of biomes.  
(a) A is true and B is also true (b) A is false but B is true  
(c) A is true but B is false (d) A is false and B is also false
12. Rain-soaked forest occurs in which state of India?  
(a) Assam (b) Meghalaya  
(c) Arunachal Pradesh (d) Nagaland
13. Just as sand: desert; \_\_\_\_\_ : Polar regions  
(a) Lichen (b) Sand  
(c) Perma frost (d) Silt
14. Which part of human body is a unique habitat for hundreds of species of microbes?  
(a) Mouth (b) Urinary bladder  
(c) Intestine (d) Spleen
15. The key elements which lead to much variation in the physical and chemical conditions of different habitat are enlisted below:  
*Temperature, Wind, Water, Light, Soil, Humidity, UV rays*  
(a) 5 (b) 6 (c) 4 (d) 3
16. A habitat of an organism constitutes \_\_\_\_\_.  
(a) Abiotic components (b) Biotic components  
(c) Symbiotic compounds (d) Both (a) and (b)
17. The organisms through natural selection have evolved \_\_\_\_\_ to optimize its survival and reproduction in its habitat.  
(a) Camouflage (b) Adaptations  
(c) Specialized Physiology (d) Higher reproduction rate
18. In tropical deserts, the temperature goes \_\_\_\_\_.  
(a)  $> 40^{\circ}\text{C}$  (b)  $> 60^{\circ}\text{C}$  (c)  $> 50^{\circ}\text{C}$  (d)  $> 70^{\circ}\text{C}$
19. Habitats such as thermal springs and deep-sea hydrothermal vents have average temperature exceeding \_\_\_\_\_.  
(a)  $100^{\circ}\text{C}$  (b)  $150^{\circ}\text{C}$  (c)  $80^{\circ}\text{C}$  (d)  $1000^{\circ}\text{C}$
20. \_\_\_\_\_ trees cannot grow in temperate countries.  
(a) Banana (b) Mango (c) Oranges (d) Peaches
21. Mango cannot grow in countries like \_\_\_\_\_.  
(a) Canada (b) Germany  
(c) Africa (d) Both (a) and (b)
22. \_\_\_\_\_ are not found in Kerala forests.  
(a) Snakes (b) Snow leopards  
(c) Elephants (d) Monkeys

23. \_\_\_\_\_ fish is rarely caught beyond tropical latitudes in ocean.  
(a) Salmon (b) Shark  
(c) Tuna (d) Pomphret
24. The temperature of habitat affects kinetics of \_\_\_\_\_ in the body of organisms.  
(a) Hormones (b) Enzymes  
(c) Inflammatory mediators (d) Neurotransmitters
25. The organisms which can tolerate and thrive in a wide range of temperature are called as \_\_\_\_\_.  
(a) Stenothermal (b) Homiotherm  
(c) Eurythermal (d) Poikilotherm
26. The organisms which thrive in a very narrow range of temperatures are known as \_\_\_\_\_.  
(a) Stenothermal (b) Poikilotherm  
(c) Homeotherm (d) Eurythermal
27. The level of thermal tolerance of different species determines the extent of \_\_\_\_\_.  
(a) Survival (b) Geographical distribution  
(c) Morphology (d) Biodiversity
28. Life originated on earth first in  
(a) Air (b) Land  
(c) Water (d) All the above
29. Special modifications with respect of \_\_\_\_\_ make it possible for an organism to survive in desert.  
(a) Water (b) High temperature  
(c) Sand (d) Less abundant plants
30. For aquatic organisms \_\_\_\_\_ of water becomes important.  
(a) Quantity (b) Quality  
(c) Conductivity (d) Specific gravity
31. The salt concentration is measured as salinity in parts per \_\_\_\_\_.  
(a) Billion (b) Million  
(c) Hundred (d) Thousand
32. The salinity of inland waters is \_\_\_\_\_.  
(a) 3 (b) 4  
(c) 5 (d) 2
33. The salinity of sea water is \_\_\_\_\_.  
(a) > 100 (b) 30–35  
(c) 60–80 (d) 10–15
34. The salinity of a hyper saline lagoon is  
(a) Up to  $10^3$  (b)  $> 10^3$   
(c) Up to  $10^2$  (d)  $> 10^2$
35. The organisms which are tolerant of a wide range of salinities are  
(a) Salinotrophs (b) Euryhaline  
(c) Salinosomes (d) Stenohaline

36. The organisms which are restricted to a narrow range of salinity are known as  
(a) Salinosomes (b) Salinotolerants  
(c) Euryhaline (d) Stenohaline
37. Fresh water animals cannot live for long in sea water because they would face problems of  
(a) Vapour pressure (b) Purity  
(c) Osmotic (d) Thermal change
38. For many animals, light is an important factors which regulates \_\_\_\_\_ variations.  
(a) Nocturnal (b) Diurnal  
(c) Urinal (d) Crepuscular
39. The activities of animals like foraging, reproductive and migratory depend on  
(a) Temperature (b) Water  
(c) Light (d) Air
40. Marine organisms, which live at a depth of > 500 m, receive solar energy in which form?  
(a) Different rays from visible spectrum (b) UV radiations  
(c) Cosmic rays (d) Infrared radiations
41. The factors which affect percolation and water holding capacity of soil are  
(a) Soil composition (b) Grain size  
(c) Aggregation (d) All of these
42. Vegetation in any area depends on  
(a) pH of soil (b) Mineral composition  
(c) Topography (d) All of these
43. The \_\_\_\_\_ characteristics often determine the type of benthic animals than can thrive there.  
(a) Composition (b) Sediment  
(c) Grain size (d) Water holding capacity
44. The process to maintain constancy of its internal environment is  
(a) Equilibrium (b) Epimorphosis  
(c) Homeostasis (d) Apoptosis
45. The 'success' of mammals is due to  
(a) Presence of mammary glands (b) Efficient osmoregulation  
(c) Efficient thermoregulation (d) Efficient magnetoreception
46. 'Shivering' during cold is beneficial for mammals. It helps to  
(a) Decrease the body temperature (b) Increase the body temperature  
(c) No change in body temperature (d) None of these
47. Which is the most effective way to get relief from high temperature?  
(a) Oil secretion increases (b) Frequent urination  
(c) High water intake (d) Profuse sweating
48. Thousands of migratory birds from Siberia come to \_\_\_\_\_ in India.  
(a) Jim Corbett National Park (b) Nal Sarovar  
(c) Keoladeo National Park (d) Manasarovar

49. In case of unfavourable conditions, many lower organisms develop \_\_\_\_\_ which helps them to survive.
- (a) Spores (b) Buds  
(c) Gametes (d) Clones
50. In higher plants \_\_\_\_\_ helps to tide over periods of stress.
- (a) Roots (b) Fruits  
(c) Seeds (d) Stem
51. Higher plants survive stressful conditions by reducing their \_\_\_\_\_ activity.
- (a) Reproductive (b) Metabolic  
(c) Growth (d) Morphogenetic
52. Bears undergo a period of \_\_\_\_\_ to escape stress during winter.
- (a) Hibernation (b) Aestivation  
(c) Sedation (d) Metamorphosis
53. Snails and fish undergo aestivation to avoid summer related problems of heat and \_\_\_\_\_
- (a) Hygroscopicity (b) Desiccation  
(c) Efflorescence (d) Starvation
54. Under unfavourable conditions, many species of zooplankton which lives in small water bodies are known to enter \_\_\_\_\_
- (a) Diapause (b) Metapause  
(c) Neopause (d) Monopause
55. Diapause is a stage of \_\_\_\_\_
- (a) Perpetual development (b) Intermittent development  
(c) Suspended development (d) Sequential development
56. \_\_\_\_\_ is any attribute of an organism that enables the organism to survive and reproduce in its habitat.
- (a) Mutation (b) Evolution  
(c) Adaptation (d) Conformation
57. Adaption includes \_\_\_\_\_ attribute of an organism.
- (a) Behavioural (b) Physiological  
(c) Morphological (d) All of these
58. Many adaptations of an organism have evolved over a long duration of evolution and are \_\_\_\_\_
- (a) Genetically unstable (b) Genetically fixed  
(c) Genetically disadvantageous (d) Genetically extemporaneous
59. \_\_\_\_\_ in North American deserts is capable of meeting all its water requirements through its internal biochemical process.
- (a) Llama (b) Coyote  
(c) Kangaroo rat (d) Weasel
60. By which biochemical process, kangaroo rat meets its water requirement?
- (a) Reduction of fats (b) Oxidation of proteins  
(c) Reduction of proteins (d) Oxidation of fats

61. Water molecule is a by-product in which of the following process?  
(a) Reduction of fats (b) Oxidation of proteins  
(c) Reduction of proteins (d) Oxidation of fats
62. Desert animals have the capability of forming \_\_\_\_\_ urine.  
(a) Hypotonic (b) Isosmotic  
(c) Concentrated (d) Dilute
63. Select the true statement from the following options:  
(a) Desert plants have thick cuticle on their body.  
(b) Stomata are arranged superficially.  
(c) Minimum loss of water through fat oxidation.  
(d) Special photosynthetic pathway occurs in desert plants.
64. An important feature regarding CAM pathway in desert plants  
(a) Enables stomata to increase the number of chloroplasts.  
(b) Enables stomata to remain open during any time.  
(c) Enables stomata to remain closed during day time.  
(d) Enables stomata to open during rainy weather.
65. Some desert plants like \_\_\_\_\_ have no leaves.  
(a) Muehlenbeckia (b) Opuntia  
(c) Nephrolepis (d) All of these
66. Photosynthetic function in opuntia is performed by \_\_\_\_\_  
(a) Roots (b) Flowers  
(c) Fruits (d) Stems
67. In opuntia, leaves are reduced to \_\_\_\_\_  
(a) Thorns (b) Prickles  
(c) Spines (d) Buds
68. Allen's rule is with respect to \_\_\_\_\_  
(a) Reptiles (b) Mammals  
(c) Aves (d) Amphibia
69. Mammals from colder climates generally have \_\_\_\_\_ ears and limbs to minimize heat loss.  
(a) Reduced (b) Shorter  
(c) Longer (d) Wider
70. Aquatic mammals in polar seas have a thick layer of fat known as \_\_\_\_\_  
(a) Blubber (b) Flubber  
(c) Rubber (d) Stubber
71. A thick layer of fat under the skin in aquatic mammals essentially acts as \_\_\_\_\_  
(a) Food reservoir (b) Insulator  
(c) Conductor (d) Heat generator
72. Visiting a place like Manali and Mansarovar gives you an uncomfortable feeling. This is referred to as \_\_\_\_\_  
(a) Motion Sickness (b) Altitude Sickness  
(c) Acrophobia (d) All of these

73. With the increase in altitude of a place \_\_\_\_\_
- (a) Atmospheric pressure decreases                      (b) Atmospheric pressure increases  
(c) Atmospheric pressure remain constant              (d) Either (a) or (b)
74. The symptoms of altitude sickness are
- (a) Nausea                                                              (b) Heart palpitations  
(c) Fatigue                                                              (d) All of these
75. How acclimatization occurs in case of altitude sickness?
- (a) Decrease RBC production                                      (b) Increased RBC production  
(c) Increased rate of breathing                                      (d) Both (b) and (c)
76. Which bacteria can flourish in hot springs and deep sea hydrothermal vents?
- (a) Cyanobacteria                                                      (b) Archaeobacteria  
(c) Actinobacteria                                                      (d) Acidobacteria
77. Many fish thrive in Antarctic water where the temperature is \_\_\_\_\_.
- (a) Always above zero                                              (b) Always above 4°C  
(c) Always below zero                                              (d) Sometimes below zero
78. How much pressure is experienced by marine invertebrates and fishes living at the great depths in oceans?
- (a) < 100 times that of normal atmospheric pressure  
(b) < 100 times that of hydrostatic pressure  
(c) > 100 times that of hydrostatic pressure  
(d) > 100 times that of normal atmospheric pressure
79. Which of the following animals lack the physiological ability to deal with high temperature in their habitat?
- (a) Giant frilled lizard                                              (b) Desert lizard  
(c) Kangaroo rat                                                              (d) Weasel
80. What adaptation desert lizard shows to deal with high temperature?
- (a) Bask in sun when body temperature drops.  
(b) Move in shade when body temperature drops.  
(c) Bask in sun when ambient temperature drops.  
(d) Move in shade when ambient temperature drops.
81. The main reason behind building burrows in soil by burrowing animals is \_\_\_\_\_.
- (a) To escape from predators.  
(b) To derive nutrition parts of plants from underground.  
(c) The mode of evolution chose burrows as a specific habitat.  
(d) To hide and escape from the above-ground heat.

### **Populations**

82. Which of the following is not a population attribute?
- (a) Majority of them live in groups in a well-defined geographical location.  
(b) Share or compete for similar resources.  
(c) Potentially interbreed  
(d) Single individuals of any species cannot live in isolation.

83. Individuals resulting from asexual reproduction are also considered \_\_\_\_\_ while performing ecological studies.  
 (a) Biome (b) Ecosystem (c) Population (d) Species
84. As teakwood: Forest tracts, \_\_\_\_\_ : Wetland.  
 (a) Lotus (b) Rats  
 (c) Squirrels (d) Cormorants
85. To evolve certain desired traits, natural selection should operate at \_\_\_\_\_ level.  
 (a) Species (b) Biomes (c) Population (d) Genus
86. Population ecology is a bridge between evolution and \_\_\_\_\_.  
 (a) Population morphology (b) Population genetics  
 (c) Population proteomics (d) Population variation
87. After poaching 3 lions in certain forest of Gujarat, only 15 are left in a year. Determine the death rate per capita.  
 (a) 5.000 (b) 0.200 (c) 0.166 (d) 0.800
88. The population size of Siberian cranes at Bharatpur wetlands in any year is \_\_\_\_\_.  
 (a) 10 (b) 100 (c) 1000 (d) 5
89. Population size in any given habitat is also known as \_\_\_\_\_.  
 (a) Population cluster (b) Population explosion  
 (c) Population abundance (d) Population density
90. Tiger census in our national parks and tiger reserves is done by counting  
 (a) Tiger cubs (b) Tiger pug marks  
 (c) Tiger faecal pellets (d) Both (b) and (c)
91. Natality refers to  
 (a) Number of births in a given geographical area.  
 (b) Number of births in a given time period.  
 (c) Number of births under influence of given environmental factor.  
 (d) Number of deaths in a given time period.
92. A striking difference between immigration and emigration is \_\_\_\_\_.  
 (a) Immigration considers total number of species in a given habitat while emigration refers to a single species.  
 (b) Emigration considers total number of species in a given habitat while immigration refers to a single species.  
 (c) Immigration considers total number of dominant species in a given habitat while emigration refers to a single species.  
 (d) Immigration considers total number of species in a given habitat while emigration refers to a dominant single species.
93. Identify the correct equation for population density at time  $t + 1$   
 (a)  $N = N_t + [(D + I) - (B + E)]$  (b)  $N = N_t + [(B + I) - (D + E)]$   
 (c)  $N_{t+1} = N_t + [(B + D) - (I + E)]$  (d)  $N_{t+1} = N_t + [(B + I) - (D + E)]$
94. If a new habitat is just being colonized then which of the following options do you think would have a greater contribution towards population density?

- (a) Mortality (b) Natality  
(c) Immigration (d) Emigration
95. While developing the theory of natural selection, Darwin observed that each species could realize fully its innate potential to grow in the number provided in a particular habitat \_\_\_\_\_  
(a) Favourable environmental conditions are prevalent.  
(b) Absence of natural disasters like floods and famine.  
(c) Availability of unlimited resources.  
(d) Development of mutation in certain species.
96. Study the following equation in context of population growth and choose the correct option  

$$\frac{dN}{dt} = (b - d) \times N \quad (i)$$
 Substituting  $r$  in place of  $b - d$  then  

$$\frac{dN}{dt} = rN \quad (ii)$$
 Here 'r' is known as \_\_\_\_\_  
 (a) Extrinsic rate of natural decrease (b) Intrinsic rate of natural decrease  
 (c) Intrinsic rate of natural increase (d) Extrinsic rate of natural increase
97. The  $r$  value for Norway rat is \_\_\_\_\_  
 (a) 0.15 (b) 0.0015 (c) 0.015 (d) 1.5
98. The  $r$  value for flour beetle is \_\_\_\_\_  
 (a) 0.15 (b) 0.12 (c) 0.21 (d) 0.012
99. The  $r$  value for human population in India is \_\_\_\_\_  
 (a) 0.15 (b) 0.0502 (c) 0.0205 (d) 0.012
100. When  $N$  (population density) is plotted against time \_\_\_\_\_ shaped graph is obtained (using equation (ii) as per question 99)  
 (a) S (b) J  
 (c) U (d) Inverted U
101. The integral form of equation (ii) as given in question 98 is \_\_\_\_\_  
 (a)  $N = N_0 e^{rN}$  (b)  $N = N_0 e^{rt}$   
 (c)  $N_t = N_0 e^{rN}$  (d)  $N_t = N_0 e^{rt}$
102. Any species growing exponentially under \_\_\_\_\_ resource conditions can reach massive population densities in a short time span  
 (a) Limited (b) Unlimited  
 (c) Essential (d) Non-essential
103. Carrying capacity  $K$  means \_\_\_\_\_  
 (a) Organism's capability of maximum reproduction.  
 (b) Nature's limit for supporting maximum growth of a species.  
 (c) Nature's limit for supporting maximum number of species.  
 (d) Organism's capability to withstand environmental odds.
104. If a population grows in a habitat with limited resources, then following phases of achievement are observed  
 (a) Lag → Acceleration → Deceleration → Asymptote  
 (b) Log → Deceleration → Acceleration → Asymptote  
 (c) Log → Acceleration → Deceleration → Asymptote  
 (d) Lag → Acceleration → Asymptote → Deceleration



105. The sigmoid curve of population growth is also known as  
 (a) Wagner-Nelson logistic growth (b) Lineweaver-Burk logistic growth  
 (c) Verhulst-Pearl logistic growth (d) Darwin's logistic growth
106. Which of the following equation correctly describes sigmoid growth curve?  
 (a)  $dN/dt = rN \left( \frac{K - N}{r} \right)$  (b)  $dN/dt = rN \left( \frac{K - N}{t} \right)$   
 (c)  $dN/dt = N \left( \frac{K - N}{N} \right)$  (d)  $dN/dt = rN \left( \frac{K - N}{K} \right)$
107. The reproductive fitness of a population in a certain habitat is also termed as \_\_\_\_\_  
 (a) Verhulst's fitness (b) Darwin's fitness  
 (c) Lamarckian fitness (d) Huxley's fitness
108. In order to achieve maximum population in a habitat, which of the following is correct?  
 (a) High r value (b) Low r value  
 (c) Independent of r value (d) Optimum r value
109. The organism breeding only once in its lifetime is \_\_\_\_\_  
 (a) Atlantic tuna fish (b) Indian pomfret fish  
 (c) Pacific salmon fish (d) Arctic whale
110. Amongst plants, select the correct option which breeds only once in lifetime.  
 (a) Banyan (b) Bamboo  
 (c) Oak (d) Pine
111. \_\_\_\_\_ is a more meaningful measure of population size.  
 (a) Natality (b) Mortality  
 (c) Biomass (d) Resources consumed
112. Pick out the essential resources for a population in a given habitat from the following  
 Food, Water, Air, Space  
 (a) Food and water (b) Food and space  
 (c) Air and space (d) Water and space
113. Nearly \_\_\_\_\_ of all insects are known to be phytophagous.  
 (a) 25% (b) 35% (c) 45% (d) 10%
114. Thorns are the most common morphological means of defense in  
 (a) Acacia (b) Cactus  
 (c) Calotropis (d) Both (a) and (b)
115. Which of the following weed plant produces cardiac glycosides (highly poisonous material)?  
 (a) Acacia (b) Cactus  
 (c) Calotropis (d) All of these
116. Which of the following substance are produced by plants as defense against grazers and browsers (count numbers)?  
*Nicotine, Caffeine, Quinine, Strychnine, Opium*  
 (a) 2 (b) 3 (c) 4 (d) 5



- (a) Chthamalus, Balanus (b) Balanus, Balanus  
(c) Chthamalus, Chthamalus (d) Balanus, Chthamalus
127. According to Darwin which competition is a potent force in organic evolution?  
(a) Inter-specific (b) Intra-specific (c) Both (a) and (b) (d) None of these
128. In some shallow South American lakes, which of the following compete for the same food that is zooplanktons of lake?  
(a) Visiting flamingos (b) Resident fishes  
(c) Both (a) and (b) (d) None of these
129. Find out the true statement.  
(a) Totally unrelated species could also compete for the same resources.  
(b) Resources need not to be limiting for competition to occur.  
(c) In interference competition, feed efficiency of one species might be reduced due to the interfering and inhibitory presence of the other species, even if resources are abundant.  
(d) All are true
130. Which of the following are adaptations of parasite?  
(a) Loss of unnecessary sense organ (b) Loss of digestive system  
(c) High reproductive capacity (d) All of these
131. Liver fluke belongs to the class  
(a) Cestoda (b) Trematoda (c) Hirudinaria (d) Turbellaria
132. Liver fluke complete its cycle in how many intermediate hosts?  
(a) 1 (b) 2 (c) 3 (d) 4
133. Human liver fluke has two intermediate hosts in its life cycle; these are  
(a) Snail and hydra (b) Crustacean and fish  
(c) Snail and fish (d) Mosquito and snail
134. Effect of parasite on host  
(a) Reduce survival (b) Reduce growth and reproduction  
(c) Reduce its population density (d) All of these
135. Malarial parasites require which vector to spread to other hosts  
(a) Snail (b) Fish (c) Housefly (d) Mosquito
136. Find out the correct example of ectoparasite.  
(a) Lice on humans (b) Ticks on dogs  
(c) Copepods in marine fishes (d) All are correct
137. Cuscuta, a parasitic plant that is commonly found growing on hedge plants has lost its \_\_\_\_\_ and \_\_\_\_\_ in the course of evolution  
(a) Root and stem (b) Leaves and chlorophyll  
(c) Root and leaves (d) Leaves and stem
138. Female mosquito requires our blood for  
(a) Respiration (b) Locomotion (c) Digestion (d) Reproduction
139. Which of the following is not a parasite?  
(a) Tapeworm (b) Female anopheles mosquito  
(c) Liver fluke (d) Lice

140. Find out the false statement.
- (a) Parasite that feeds on the external surface of the host organism are called ectoparasite.
  - (b) The life cycle of endoparasite are more complex because of their extreme specialization.
  - (c) Parasitism evolved in so many taxonomic groups from plants to higher vertebrates.
  - (d) Endoparasites have greatly complex morphological and anatomical features along with high reproductive potential.
141. Example of brood parasitism
- (a) Cuckoo (koel) and crow
  - (b) Crow and parrot
  - (c) Parrot and pigeon
  - (d) Koel and parrot
142. Find out the incorrect statement.
- (a) In brood parasitism (of Koel and Crow), the eggs of parasitic bird have evolved to resemble the host's egg in size and colour to reduce the chance of the host bird detecting the foreign eggs and ejecting them from the host.
  - (b) Majority of parasite harming the host.
  - (c) Many parasites have evolved to be host specific in such a way that both host and the parasite tend to coevolve.
  - (d) Monarch butterfly acquires chemical by feeding on a poisonous weed in its adult stage, that chemical makes it highly distasteful to its bird.
143. Which of the following shows commensalism?
- (a) Sea anemone and clown fish
  - (b) Lichens
  - (c) Lice and human
  - (d) Mycorrhizae
144. Commensalism is shown by all except
- (a) Orchid on mango branch
  - (b) Cattle egret and grazing cattle
  - (c) Sea anemone and clown fish
  - (d) Cuckoo (Koel) and crow
145. Lichens are mutualistic relationship between
- (a) Fungus and photosynthetic algae
  - (b) Fungus and cyanobacteria
  - (c) Fungus and roots of higher plants
  - (d) Both (a) and (b)
146. Mycorrhizae are association between
- (a) Fungus and photosynthetic algae
  - (b) Fungus and roots of higher plants
  - (c) Fungus and cyanobacteria
  - (d) Fig plant and wasp
147. Pseudocopulation helps in pollination in
- (a) Fig plant
  - (b) Orchid
  - (c) Cuscuta
  - (d) Sunflower
148. The best example of co-evolution
- (a) Fig trees and pollinator species of wasp
  - (b) Fungus and cyanobacteria
  - (c) Sea anemone and clown fish
  - (d) All of these
149. Fruit of fig species provide
- (a) Egg laying site to female wasp for oviposition
  - (b) Developing seed as food for the developing wasp larvae
  - (c) Both (a) and (b)
  - (d) None of these
150. Select the incorrect statement.
- (a) The mediterranean orchid ophrys employs sexual deceit to get pollinated.
  - (b) In mycorrhazial association, fungi helps the plant in the absorption of essential nutrients from the soil.

- (c) *Pinus* seeds cannot germinate and establish without the presence of mycorrhizae.  
 (d) When resources are unlimited, the growth is usually logistic but when resources become progressively limiting, the growth pattern turns exponential.

151. In *Ophrys*, one petal of female flower bears an uncanny resemblance to the female of the bee in which of the following aspect?  
 (a) Size (b) Colour (c) Markings (d) All of these
152. Fill in the blanks A, B, C, and D respectively.

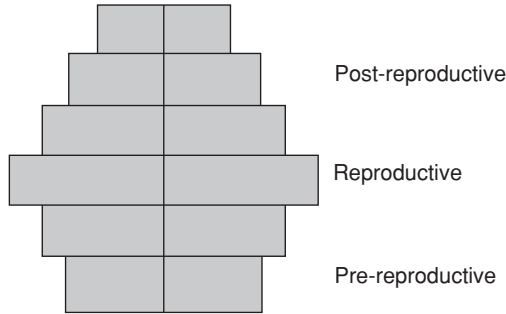
| Species A | Species B | Name of Interaction |
|-----------|-----------|---------------------|
| +         | +         | Mutualism           |
| -         | -         | _A_                 |
| +         | -         | _B_                 |
| +         | -         | Parasitism          |
| +         | 0         | _C_                 |
| -         | 0         | _D_                 |

(+) Beneficial (-) detrimental (0) Neutral

- (a) A: Commensalism, B: Predation, C: Amensalism, D: Competition  
 (b) A: Predation, B: Parasitism, C: Commensalism, D: Amensalism  
 (c) A: Competition, B: Predation, C: Commensalism, D: Amensalism  
 (d) A: Competition, B: Predation, C: Amensalism, D: Commensalism
153. In which of the following interaction only one of the species is benefited?  
 (a) Mutualism (b) Competition  
 (c) Parasitism and predation (d) Amensalism
154. Which of the natural habitat on earth is inhabited just by a single species?  
 (a) Hot vents (b) Forest (c) Polar region (d) None of these
155. The following breeds many times during their lifetime except  
 (a) Birds (b) Mammals  
 (c) Amphibians (d) Pacific salmon fish
156. Which of the following produce large number of small sized offsprings?  
 (a) Oyster (b) Pelagic fishes (c) Mammals (d) Both (a) and (b)
157. Populations evolve to maximize their  
 (a) Health fitness (b) Body fitness  
 (c) Mental fitness (d) Reproductive fitness
158. Find out the correct statement.  
 (a) Under particular set of selection progresses, organism evolve towards the most efficient reproductive strategy.  
 (b) In amensalism, one species is harmed whereas the other is benefited.  
 (c) Some species of insects and frogs are cryptically coloured (camouflaged) to avoid being detected easily by the prey.

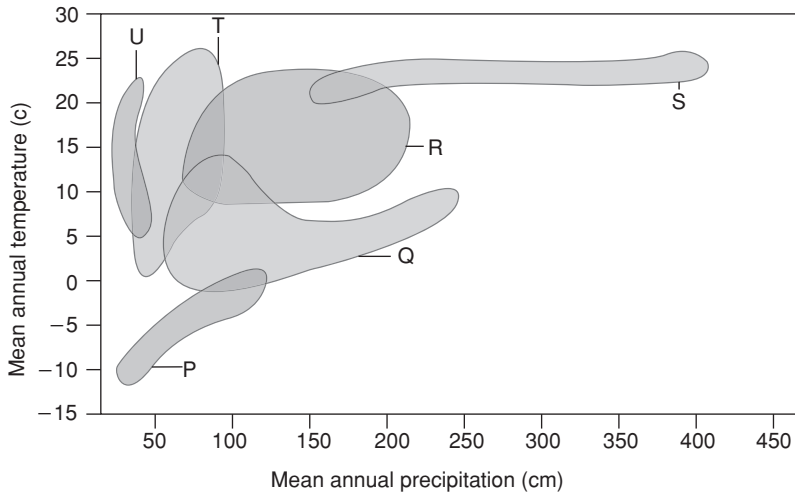
(d) 'Biological Control' methods adopted in agricultural pest control are based on the ability of the prey to regulate predator population.

159. What type of human population is represented by the adjacent pyramid?



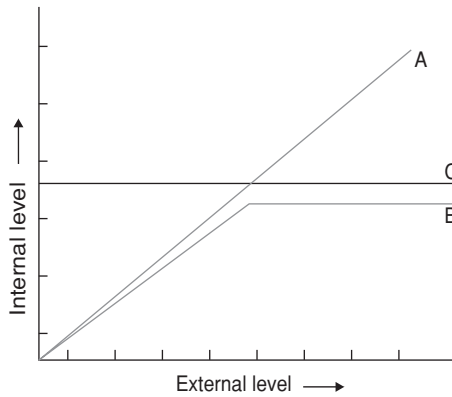
- (a) Expanding population
- (b) Vanishing population
- (c) Stable population
- (4) Declining population

160. Select the correct matching from the below diagram:

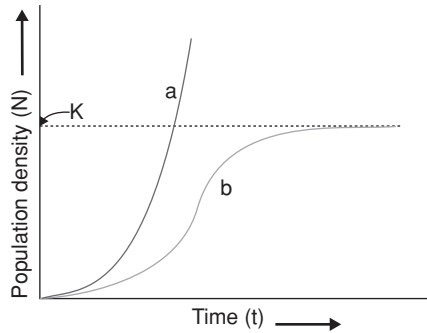


- (a) P: Desert, Q: Tropical forest, R: Temperate forest, S: Coniferous forest
- (b) P: Grassland, Q: Temperate forest, R: Desert, S: Arctic and Alpine tundra
- (c) P: Arctic and Alpine tundra, Q: Coniferous forest, R: Temperate forest, S: Tropical forest
- (d) P: Coniferous forest, Q: Grassland, R: Desert, S: Tropical forest

161. The figure given below is a diagrammatic representation of response of organisms to abiotic factors. What do (A), (B) and (C) represent respectively?



- (a) A: Conformers, B: Partial regulators C: Regulators
- (b) A: Partial regulators, B: Conformers, C: Regulators
- (c) A: Regulators, B: Partial regulators, C: Conformers
- (d) A: Conformers, B: Regulators, C: Partial regulators



Questions 162 to 167 are based on the above diagram.

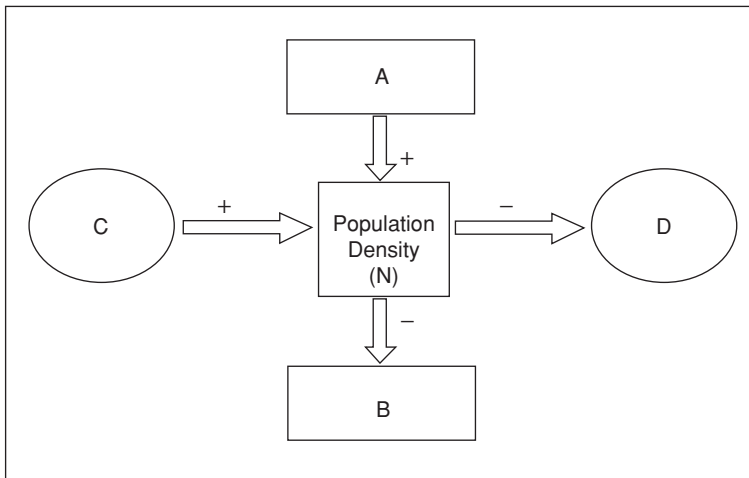
162. Graph 'a' is represented by the formula:

- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| (a) $\frac{dN}{dt} = rN$                                | (b) $\frac{dN}{dt} = N$                                |
| (c) $\frac{dN}{dt} = rN \left( \frac{K - N}{K} \right)$ | (d) $\frac{dN}{dt} = N \left( \frac{K - N}{K} \right)$ |

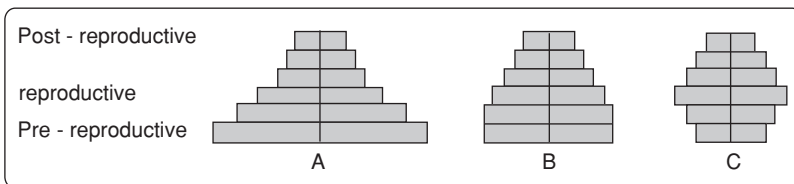
163. Graph 'b' is represented by the formula:

- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| (a) $\frac{dN}{dt} = rN$                                | (b) $\frac{dN}{dt} = N$                                |
| (c) $\frac{dN}{dt} = rN \left( \frac{K - N}{K} \right)$ | (d) $\frac{dN}{dt} = N \left( \frac{K - N}{K} \right)$ |

164. What is the meaning of K?  
 (a) Intrinsic rate of natural reproduction (b) Population density at time zero  
 (c) Carrying capacity (d) Population density after time t
165. Plot b is known as  
 (a) Exponential growth curve (b) Logistic growth curve  
 (c) Verhulst-Pearl Logistic growth curve (d) Both (b) and (c)
166. Which of the growth curve is considered a more realistic one?  
 (a) Curve a (b) Curve b  
 (c) Both (a) and (b) (d) None of these
167. Identify A, B, C and D in this figure.



- (a) A: Immigration (I), B: Emigration (E), C: Natality (B), D: Mortality (D)  
 (b) A: Natality (B), B: immigration (I), C: Mortality (D), D: Emigration (E)  
 (c) A: Mortality (D), B: Emigration (E), C: Natality (B), D: Immigration (I)  
 (d) A: Mortality (D), B: Natality (B), C: Emigration (E), D: Immigration (I)
168. Identify A, B and C in the below figure of age pyramid for human population?



- (a) A: Declining, B: Stable, C: Expanding (b) A: Stable, B: Expanding, C: Declining  
 (c) A: Expanding, B: Stable, C: Declining (d) A: Stable, B: Declining, C: Expanding
169. Biotic potential refers to  
 (a) Increase of population under optimum conditions.  
 (b) Increase of population under given conditions.



- (c) Increase of population under natural conditions.  
(d) Increase of population under climatic conditions.
170. A population has more young individuals compared to the older individuals. What would be the status of the population after some years?  
(a) It will decline  
(b) It will stabilize  
(c) It will increase  
(d) It will first decline and then stabilize
171. What parameters are used for tiger census in our country's national parks and sanctuaries?  
(a) Pug marks only  
(b) Pug marks and faecal pellets  
(c) Faecal pellets only  
(d) Actual head counts
172. Which of the following would necessarily decrease the density of a population in a given habitat?  
(a) Natality > mortality  
(b) Immigration > emigration  
(c) Mortality and emigration  
(d) Natality and immigration
173. A protozoan reproduces by binary fission. What will be the number of protozoans in its population after six generations?  
(a) 128                      (b) 24                      (c) 64                      (d) 32
174. Diapause is  
(a) Adaptation to terrestrial life.  
(b) Stage of suspended development seen in unfavourable conditions in many zooplankton species in lakes and ponds.  
(c) Method of migration from stressful habitat to a more hospitable area.  
(d) It is a type of symbiosis.
175. Amensalism is an association between two species where  
(a) One species is harmed and other is benefited.  
(b) One species is harmed and other is unaffected.  
(c) One species is benefited and other is unaffected.  
(d) Both the species are harmed
176. Lichens are the associations of  
(a) Bacteria and fungus                      (b) Algae and bacterium  
(c) Fungus and algae                      (d) Fungus and virus
177. Which of the following is a partial root parasite?  
(a) Sandal wood                      (b) Mistletoe  
(c) Orobanche                      (d) Ganoderma
178. Which one of the following organisms reproduces sexually only once in its life time?  
(a) Banana plant                      (b) Mango  
(c) Tomato                      (d) Eucalyptus

179. Which plant is pollinated by the below insect?



- (a) Orchid flower
- (b) Fig flower
- (c) Sunflower
- (d) Lotus flower

180. The below diagram represents which flower?



- (a) Orchid flower
- (b) Fig flower
- (c) Sunflower
- (d) Rose flower

181. The below diagram shows some insects laying eggs in the fruit. Find out the insects from the following.



- (a) Wasp
- (b) Female anopheles
- (b) Culex
- (d) Honeybee

**ASSERTION AND REASON QUESTIONS**

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

182. **Assertion:** Ecology is basically concerned with four levels of biological organization, organism, populations, communities and biomes.  
**Reason:** Ecology is a subject which studies the interactions among organisms and between the organism and its physical environment.
183. **Assertion:** Temperature is the most ecologically relevant environmental factor.  
**Reason:** Temperature affects the kinetics of enzyme.
184. **Assertion:** Many species of small plants (herbs and shrubs) growing in forests are adapted to photosynthesize optimally under very low light conditions.  
**Reason:** These plants are constantly overshadowed by tall, canopied trees.
185. **Assertion:** The availability of light on land is closely linked with that of temperature.  
**Reason:** Sun is the source for both light and temperature.
186. **Assertion:** Mammals can thrive weather they live in Antarctica or in Sahara desert.  
**Reason:** Success of mammals is largely due to their ability to maintain a constant body temperature.
187. **Assertion:** Very small animals are rarely found in Polar regions.  
**Reason:** Small animals have a larger surface area relative to their volume; they tend to lose body heat very fast when it is cold outside.
188. **Assertion:** Mammals from colder climates generally have shorter ears and limbs.  
**Reason:** It is to maximize the heat loss.
189. **Assertion:** Predators can help in maintaining species diversity in a community.  
**Reason:** It is by reducing the intensity of competition among competing prey species.
190. **Assertion:** Mycorrhizae are association between fungi and roots of higher plants.  
**Reason:** Lichens represent mutualistic relationship between fungus and photosynthetic algae or cyanobacteria.
191. **Assertion:** Parasitism and predation are considered to be negative interactions.  
**Reason :** Parasites and predators limit the population of their host species.
192. **Assertion:** Cuscuta lost its chlorophyll and leaves in the course of evolution.  
**Reason:** Cuscuta is a total parasite.
193. **Assertion:** The life cycle of endoparasite is more complex.  
**Reason:** Endoparasite show extreme specialisation.

194. **Assertion:** Parasite may reduce population density of its host.  
**Reason:** Parasite may reduce survival growth and reproduction of host.
195. **Assertion:** Kangaroo rat use minimal water for removal of excretory product.  
**Reason:** Kangaroo rat has the ability to concentrate urine.
196. **Assertion:** We maintain a constant body temperature to 37°C, in summer when outside temperature is more than our body temperature.  
**Reason:** We sweat profusely in summer, which brings down the body temperature.
197. **Assertion:** Desert lizards have physiological ability to main body temperature.  
**Reason:** Desert lizards are warm blooded animals.
198. **Assertion:** Population ecology, an important area of ecology.  
**Reason:** It links ecology to population genetics and evolution.
199. **Assertion:** Total number is not an easily adoptable measure for population size.  
**Reason:** If the population is huge and counting is impossible and time consuming.
200. **Assertion:** The size of a population for any species is not a static parameter.  
**Reason:** It doesn't depend on food availability, predation pressure and adverse and adverse weather.
201. **Assertion:** Immigration contributes to decrease in population.  
**Reason:** Emigration contributes to increase in population.
202. **Assertion:** Female mosquito is not considered as parasite although it needs our blood for reproduction.  
**Reason:** Parasitism is aimed to obtain either food or shelter.
203. **Assertion:** Photosynthesis is an essential life process of plants.  
**Reason:** Small plants growing in forest are adapted to other process than photosynthesis because they are over-shadowed by tall canopied trees.
204. **Assertion:** Due to change in seasons, temperature also changes.  
**Reason:** To cope up with this, plants can regulate the internal body temperature.
205. **Assertion:** A particular species in nature can achieve exponential growth.  
**Reason:** Availability of unlimited resources makes it possible.

---

### PREVIOUS YEAR QUESTIONS

---

1. Which one of the following is most appropriately defined?

[AIPMT MAINS 2010]

- (a) Host is an organism which provides food to another organism.  
(b) Amensalism is a relationship in which one species is benefited whereas the other is unaffected.  
(c) Predator is an organism that catches and kills other organism for food.  
(d) Parasite is an organism which always lives inside the body of other organism and may kill it.



Which one of the following options, gives the correct fill ups for the respective blank numbers from (a) to (e) in the statements?

- (a) (c) stable (d) commensalism, (e) marsh  
 (b) (a) aestivation, (b) escape, (c) stable, (d) mutualism  
 (c) (c) expanding, (d) commensalism, (e) biodiversity park  
 (d) (a) hibernation, (b) escape, (c) expanding (e) hot spot

7. The logistic population growth is expressed by the equation

[AIPMT MAINS 2011]

- (a)  $\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$  (b)  $\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$   
 (c)  $\frac{dN}{dt} = rN$  (d)  $\frac{dN}{dt} = rN \left( \frac{N-K}{N} \right)$

8. Consider the following four conditions (A-D) and select the correct pair of them as adaptation to environment in desert lizards.

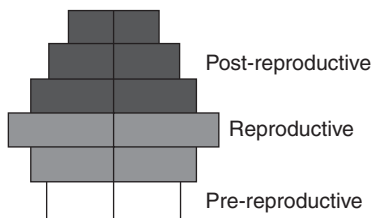
**The conditions:**

- (A) Burrowing in soil to escape high temperature.  
 (B) Losing heat rapidly from the body during high temperature.  
 (C) Bask in sun when temperature is low.  
 (D) Insulating body due to thick fatty dermis.

[AIPMT PRE 2011]

- (a) (A) and (C) (b) (B) and (D) (c) (A) and (B) (d) (C) and (D)

9. What type of human population is represented by the following age pyramid?



[AIPMT PRE 2011]

- (a) Stable population  
 (b) Declining population  
 (c) Expanding population  
 (d) Vanishing population

10. Which one of the following is categorized as a parasite in true sense?

[AIPMT PRE 2011]

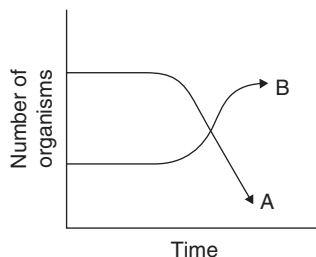
- (a) Human foetus developing inside the uterus draws nourishment from the mother.  
 (b) Head louse living on the human scalp as well as laying eggs on human hair.  
 (c) The cuckoo (koel) lays its eggs in crow's nest.  
 (d) The female Anopheles bites and sucks blood from humans.

11. Cuscuta is an example of

[AIPMT MAINS 2012]

- (a) Brood parasitism (b) Predation  
 (c) Endoparasitism (d) Ectoparasitism

12. People who have migrated from the plains to an area adjoining Rohtang Pass about six months back  
[AIPMT PRE 2012]
- Have more RBCs and their haemoglobin has a lower binding affinity to  $O_2$ .
  - Are not physically fit to play games like football.
  - Suffer from altitude sickness with symptoms like nausea, fatigue, etc.
  - Have the usual RBC count but then haemoglobin has very high binding affinity to  $O_2$ .
13. A biologist studied the population of rats in a barn. He found that the average natality was 250, average mortality is 240, immigration is 20 and emigration to be 30. The net increase in population is  
[AIPMT 2013]
- 10
  - 15
  - 05
  - Zero
14. A sedentary sea anemone gets attached to the shell lining of hermit crab. The association is  
[AIPMT 2013]
- Ectoparasitism
  - Symbiosis
  - Commensalism
  - Amensalism
15. Just as a person moving from Delhi to Shimla to escape the heat for the duration of hot summer, thousands of migratory birds from Siberia and other extremely cold northern regions move to  
[AIPMT 2014]
- Western Ghat
  - Meghalaya
  - Corbett National Park
  - Keolado National Park
16. Leaves become modified into spines in  
[AIPMT 2015]
- Opuntia
  - Pea
  - Onion
  - Skin cotton
17. The following graph depicts changes in two populations (A and B) of herbivore in a grassy field. A possible reason for these changes is that



[AIPMT 2015]

- Both plant populations in this habitat is decreased.
- Population B compound is more successful for food than population A.
- Population A produces more offspring than population B.
- Population A consumed the members of population B.

18. In which of the following interactions both partners are adversely affected? [RE-AIPMT 2015]
- (a) Predation (b) Parasitism  
(c) Mutualism (d) Competition
19. An association of individuals of different species living in the same habitat and having functional interactions is: [RE-AIPMT 2015]
- (a) Biotic community (b) Ecosystem  
(c) Population (d) Ecological niche
20. Gause's principle of competitive exclusion states that: [NEET - I, 2016]
- (a) More abundant species will exclude the less abundant species through competition  
(b) Competition for the same resources excludes species having different food preferences  
(c) No two species can occupy the same niche indefinitely for the same limiting resources  
(d) Larger organisms exclude smaller ones through competition
21. When does the growth rate of a population following the logistic model equal zero? The logistic model is given as  $dN/dt = rN(1-N/K)$ : [NEET - I, 2016]
- (a) When  $N/K$  is exactly one  
(b) When  $N$  nears the carrying capacity of the habitat  
(c) When  $N/K$  equals zero  
(d) When death rate is greater than birth rate
22. It is much easier for a small animal to run uphill than for animal, because: [NEET - I, 2016]
- (a) It is easier to carry a small body weight  
(b) Smaller animals have a higher metabolic rate  
(c) Small animals have a lower  $O_2$  requirement  
(d) The efficiency of muscles in large animals is less than in the small animals
23. The primary producers of the deep-sea hydrothermal vent ecosystem are [NEET - II, 2016]
- (a) Chemosynthetic bacteria (b) Blue-green algae  
(c) Coral reefs (d) Green algae
24. Which of the following is correct for r-selected species? [NEET - II, 2016]
- (a) Large number of progeny with large size  
(b) Small number of progeny with small size  
(c) Small number of progeny with large size  
(d) Large number of progeny with small size
25. If '+' sign is assigned to beneficial interaction, '-' sign to detrimental and '0' sign to neutral interaction, then the population interaction represented by '+' '-' refers to [NEET - II, 2016]
- (a) Amensalism (b) Commensalism  
(c) Parasitism (d) Mutualism
26. The principle of competitive exclusion was stated by [NEET - II, 2016]
- (a) G. F. Gause (b) MacArthur  
(c) Verhulst and Pearl (d) C. Darwin



## NCERT EXEMPLAR QUESTIONS

1. Autecology is the
  - (a) Relation of a population to its environment
  - (b) Relation of an individual to its environment
  - (c) Relation of a community to its environment
  - (d) Relation of a biome to its environment
2. Ecotone is
  - (a) A polluted area
  - (b) The bottom of a lake
  - (c) A zone of transition between two communities
  - (d) A zone of developing community
3. Biosphere is
  - (a) A component in the ecosystem
  - (b) Composed of the plants present in the soil
  - (c) Life in the outer space
  - (d) Composed of all living organisms present on earth which interacts with the physical environment.
4. Ecological niche is
  - (a) The surface area of the ocean.
  - (b) An ecologically adapted zone.
  - (c) The physical position and functional role of a species within the community.
  - (d) Formed of all plants and animals living at the bottom of a lake.
5. According to Allen's Rule, the mammals from colder climates have
  - (a) Shorter ears and longer limbs
  - (b) Longer ears and shorter limbs
  - (c) Longer ears and longer limbs
  - (d) Shorter ears and shorter limbs
6. Salt concentration (Salinity) of the sea measured in parts per thousand is
  - (a) 10-15
  - (b) 30-70
  - (c) 0-5
  - (d) 30-35
7. Formation of tropical forests needs mean annual temperature and mean annual precipitation as
  - (a) 18-25°C and 150-400 cm
  - (b) 5-15°C and 50-100 cm
  - (c) 30-50°C and 100-150 cm
  - (d) 5-15°C and 100-200 cm
8. Which of the following forest plants controls the light conditions at the ground?
  - (a) Lianas and climbers
  - (b) Shrubs
  - (c) Tall trees
  - (d) Herbs
9. What will happen to a well growing herbaceous plant in the forest if it is transplanted outside the forest in a park?
  - (a) It will grow normally.
  - (b) It will grow well because it is planted in the same locality.
  - (c) It may not survive because of the change in its micro climate.
  - (d) It grows very well because the plant gets more sunlight.

10. If a population of 50 paramoecium present in a pool increases to 150 after an hour, then what would be the growth rate of that population?  
(a) 50 per hour      (b) 200 per hour      (c) 5 per hour      (d) 100 per hour
11. What would be the per cent growth or birth rate per individual per hour for the same population mentioned in the previous question (Question 10)?  
(a) 100      (b) 200      (c) 50      (d) 150
12. A population has more young individuals compared to the older individuals. What would be the status of the population after some years?  
(a) It will decline      (b) It will stabilize  
(c) It will increase      (d) It will first decline and then stabilize
13. What parameters are used for the tiger census in our country's national parks and sanctuaries?  
(a) Pug marks only      (b) Pug marks and faecal pellets  
(c) Faecal pellets only      (d) Actual head counts
14. Which of the following would necessarily decrease the density of a population in a given habitat?  
(a) Natality > mortality      (b) Immigration > emigration  
(c) Mortality and emigration      (d) Natality and immigration
15. A protozoan reproduces by binary fission. What will be the number of protozoans in its population after six generations?  
(a) 128      (b) 24      (c) 64      (d) 32
16. In 2005, for each of the 14 million people present in a country, 0.028 were born and 0.008 died during the year. Using the exponential equation, the number of people present in 2015 is predicted as  
(a) 25 million      (b) 17 million      (c) 20 million      (d) 18 million
17. Amensalism is an association between two species where  
(a) One species is harmed and other is benefitted.  
(b) One species is harmed and other is unaffected.  
(c) One species is benefitted and other is unaffected.  
(d) Both the species are harmed.
18. Lichens are the associations of  
(a) Bacteria and fungus      (b) Algae and bacterium  
(c) Fungus and algae      (d) Fungus and virus
19. Which of the following is a partial root parasite?  
(a) Sandal wood      (b) Mistletoe      (c) Orobanche      (d) Ganoderma
20. Which one of the following organisms reproduces sexually only once in its life time?  
(a) Banana plant      (b) Mango  
(c) Tomato      (d) Eucalyptus

### Answer Keys

#### *Practice Questions*

1. (c) 2. (b) 3. (b) 4. (d) 5. (c) 6. (c) 7. (d) 8. (d) 9. (d) 10. (d)  
 11. (d) 12. (b) 13. (c) 14. (c) 15. (c) 16. (d) 17. (b) 18. (c) 19. (a) 20. (b)  
 21. (d) 22. (b) 23. (c) 24. (b) 25. (c) 26. (a) 27. (b) 28. (c) 29. (a) 30. (b)  
 31. (d) 32. (c) 33. (b) 34. (d) 35. (b) 36. (d) 37. (c) 38. (b) 39. (c) 40. (d)  
 41. (d) 42. (d) 43. (b) 44. (c) 45. (c) 46. (b) 47. (d) 48. (c) 49. (a) 50. (c)  
 51. (b) 52. (a) 53. (b) 54. (a) 55. (c) 56. (c) 57. (d) 58. (b) 59. (c) 60. (d)  
 61. (d) 62. (c) 63. (d) 64. (c) 65. (b) 66. (d) 67. (c) 68. (b) 69. (b) 70. (a)  
 71. (b) 72. (b) 73. (a) 74. (d) 75. (d) 76. (b) 77. (c) 78. (d) 79. (b) 80. (a)  
 81. (d) 82. (d) 83. (c) 84. (d) 85. (c) 86. (b) 87. (c) 88. (a) 89. (d) 90. (d)  
 91. (b) 92. (b) 93. (d) 94. (c) 95. (c) 96. (c) 97. (c) 98. (b) 99. (c) 100. (b)  
 101. (d) 102. (b) 103. (b) 104. (a) 105. (c) 106. (d) 107. (b) 108. (a) 109. (c) 110. (b)  
 111. (c) 112. (b) 113. (a) 114. (d) 115. (c) 116. (d) 117. (b) 118. (d) 119. (c) 120. (a)  
 121. (c) 122. (b) 123. (b) 124. (d) 125. (b) 126. (d) 127. (a) 128. (c) 129. (d) 130. (d)  
 131. (b) 132. (b) 133. (c) 134. (d) 135. (d) 136. (d) 137. (b) 138. (d) 139. (b) 140. (d)  
 141. (a) 142. (d) 143. (a) 144. (d) 145. (d) 146. (b) 147. (b) 148. (a) 149. (c) 150. (d)  
 151. (d) 152. (c) 153. (c) 154. (d) 155. (d) 156. (d) 157. (d) 158. (a) 159. (d) 160. (c)  
 161. (d) 162. (a) 163. (c) 164. (c) 165. (d) 166. (b) 167. (a) 168. (c) 169. (a) 170. (c)  
 171. (b) 172. (c) 173. (c) 174. (b) 175. (c) 176. (c) 177. (a) 178. (d) 179. (a) 180. (b)  
 181. (a)

#### *Assertion and Reason Questions*

182. (b) 183. (b) 184. (a) 185. (a) 186. (a) 187. (a) 188. (c) 189. (a) 190. (b) 191. (c)  
 192. (a) 193. (a) 194. (a) 195. (a) 196. (a) 197. (d) 198. (a) 199. (a) 200. (c) 201. (d)  
 202. (a) 203. (b) 204. (a) 205. (b)

#### *Previous Year Questions*

1. (c) 2. (d) 3. (d) 4. (a) 5. (a) 6. (d) 7. (b) 8. (a) 9. (b) 10. (b)  
 11. (d) 12. (a) 13. (d) 14. (b) 15. (d) 16. (a) 17. (b) 18. (d) 19. (a) 20. (c)  
 21. (a) 22. (b) 23. (a) 24. (d) 25. (c) 26. (a)

#### *NCERT Exemplar Questions*

1. (b) 2. (c) 3. (d) 4. (c) 5. (d) 6. (d) 7. (a) 8. (c) 9. (c) 10. (d)  
 11. (b) 12. (c) 13. (b) 14. (c) 15. (c) 16. (b) 17. (b) 18. (c) 19. (a) 20. (a)



11. The unit of primary production is  
(a)  $\text{g/m}^2$  (b)  $\text{kcal/m}^2$   
(c) Both (a) and (b) (d) None of these
12. NPP is equal to  
(a)  $\text{GPP} + \text{R}$  (b)  $\text{GPP} - \text{R}$   
(c)  $\text{GPP} \times \text{R}$  (d)  $\text{GPP} \div \text{R}$
13. Secondary productivity means  
(a) Rate of formation of organic matter by producer.  
(b) Rate of formation of new organic matter by consumers.  
(c) Rate of formation of inorganic matter by producer.  
(d) Rate of formation of inorganic matter by consumers.
14. Primary productivity depends on which of the following factors?  
(a) Environmental factor (b) Photosynthetic capacity of plant  
(c) Availability of nutrients (d) All the above
15. GPP means  
(a) Gross Public Partnership (b) Gross Primary Production  
(c) Gross Producer Production (d) Gross Plant Production
16. The unit of productivity is  
(a)  $\text{gm}^{-2}\text{yr}^{-1}$  (b)  $\text{Kcal/m}^2/\text{year}$   
(c) Both (a) and (b) (d) None
17. NPP means  
(a) Available biomass for the consumption of heterotrophs  
(b) Biomass produced by producers  
(c) Gross primary product of respiratory losses  
(d) All of the above
18. The annual net primary productivity of the whole biosphere is how much billion tons (dry weight) of organic matter?  
(a) 120 (b) 170 (c) 210 (d) 150
19. Oceans occupy \_\_\_\_\_ % of the surface of earth but productivity of ocean are \_\_\_\_\_ billion tons.  
(a) 70, 45 (b) 60, 55 (c) 70, 55 (d) 60, 65
20. The productivity of ocean is less because  
(a) It occupies 70 per cent of earth's surface.  
(b) Light is a major limiting factor which decreases with increase in water depth.  
(c) It contains algae as a chief producer.  
(d) All the above
21. What is the percentage of primary productivity of oceans?  
(a) 50% (b) 90% (c) 32% (d) 70%
22. Earthworms help in  
(a) Breakdown of complex organic matter (b) Loosening of soil  
(c) Both (a) and (b) (d) None of these

23. Detritus contain
- Dead plant remains (leaves, bark and flower)
  - Dead animal remains
  - Fecal matter
  - All the above

### Decomposition

24. The important steps in the process of decomposition are
- Fragmentation
  - Leaching
  - Catabolism
  - All of these

25. Match the columns:

| Column-I         | Column-II                                                       |
|------------------|-----------------------------------------------------------------|
| 1. Fragmentation | A. Break down of detritus into smaller particles                |
| 2. Leaching      | B. Precipitation of water soluble nutrients as unavailable salt |
| 3. Catabolism    | C. Degradation of detritus by bacterial and fungal enzymes      |

- 1-A, 2-B, 3-C
  - 1-B, 2-C, 3-A
  - 1-C, 2-B, 3-A
  - 1-C, 2-A, 3-B
26. Which of these are true about humus?
- Dark coloured amorphous substance
  - Colloidal in nature
  - Reservoir of nutrient
  - All of these
27. Humus is degraded by some microbes and release of inorganic nutrients occur by the process known as \_\_\_\_\_.
- Fragmentation
  - Leaching
  - Humidification
  - Mineralization
28. Find out the total number of incorrect statements from the following:
- Decomposition is largely an anaerobic process.
  - Fragmentation, leaching and catabolism occur simultaneously on detritus.
  - Vertical distribution of different species occupying different level is called stratification.
  - Pond is a deep water body.
  - The rate of decomposition is controlled by chemical composition of detritus and climatic factors.
- 1
  - 2
  - 3
  - 4
29. Decomposition is favoured by
- Warm and moist environment.
  - Rich amount of nitrogen and water soluble substance like sugar in detritus.
  - Aerobic environment
  - All the above
30. The rate of decomposition process is decreased by
- Aerobic environment
  - Rich amount of lignin and chitin in detritus
  - Warm and moist environment
  - All the above
31. What is the main source of energy for all ecosystems on earth?
- Sun
  - Volcano
  - Deep sea hydro-thermal system
  - Moon

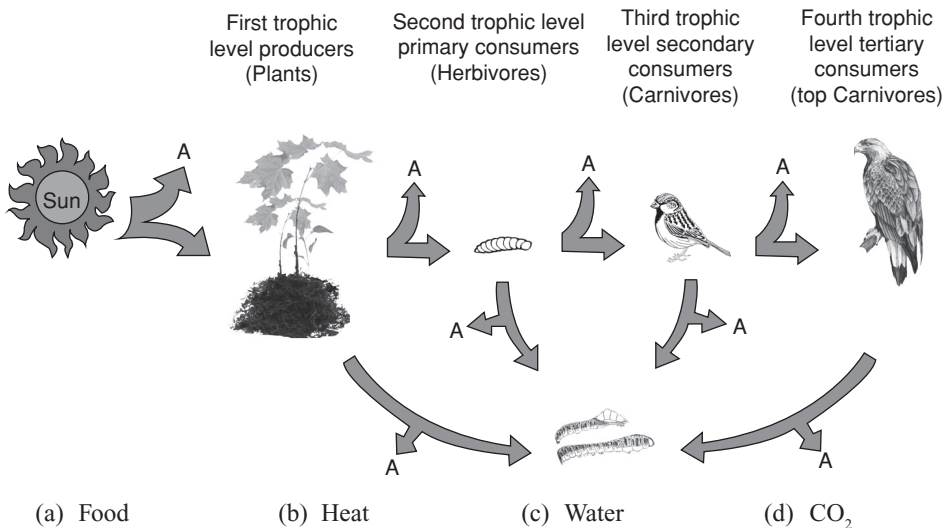
**Energy Flow**

32. PAR (Photosynthetically active radiation) from incident solar radiation is  
(a) 50% (b) 30% (c) 70% (d) 20%
33. Plant capture how much of PAR?  
(a) 2–10% (b) 10–20%  
(c) 50% (d) 30%
34. Which law is obeyed during energy flow in an ecosystem?  
(a) First law of thermodynamics (b) Second law of thermodynamics  
(c) Third law of thermodynamics (d) Both (a) and (b)
35. In a terrestrial ecosystem the major producers are  
(A) Herbs (B) Woody plant  
(C) Shrubs  
(a) A and B only (b) A and C only  
(c) A, B and C (d) B only
36. Primary producers in aquatic ecosystem are  
(a) Phytoplankton (b) Algae  
(c) Higher plant (d) All of these
37. Which of these is a primary consumer?  
(a) Grass (b) Goat  
(c) Man (d) Tiger
38. Which of these is a common herbivores in aquatic ecosystem?  
(a) Insect (b) Birds  
(c) Mammals (d) Mollusc
39. Which of the following represent simple GFC (Grazing Food Chain)?  
(a) Grass → Goat → Man (b) Goat → Grass → Man  
(c) Detritus → Fungi → Man (d) Fungi → Detritus → Grass
40. DFC (Detritus Food Chain) begins with  
(a) Dead organic matter (b) Fungi  
(c) Bacteria (d) Plant
41. The main decomposers are  
(a) Bacteria and fungus (b) Earthworm  
(c) Flagellated protozoans (d) Flagellated diatoms
42. Decomposers meet their energy and nutrient requirements by  
(a) Phytoplanktons (b) Zooplanktons  
(c) Detritus (d) Bacteria
43. GFC is a major conduit for energy flow in  
(a) Terrestrial ecosystem (b) Aquatic ecosystem  
(c) Both (a) and (b) (d) None of these
44. Decomposers shows  
(a) Intracellular digestion (b) Extracellular digestion  
(c) Both intra and extracellular digestion (d) No digestion at all

45. Find the incorrect statement.
- (a) In terrestrial ecosystem larger fraction of energy flow occurs through DFC.
  - (b) In aquatic ecosystem a major conduit for energy flow is GFC.
  - (c) Detritus food chain is not at all connected with grazing food chain at any level.
  - (d) Natural interconnection of food chain makes it a food web.
46. Based on the source of their nutrient or food, organisms occupy a specific place in the food chain that is known as their \_\_\_\_\_.
- (a) Hierarchy position
  - (b) Class
  - (c) Order
  - (d) Trophic level
47. Herbivores are
- (a) Producers
  - (b) Primary consumers
  - (c) Secondary consumer
  - (d) Tertiary consumers
48. Plants are
- (a) Producers
  - (b) Primary consumers
  - (c) Secondary consumers
  - (d) Tertiary consumers

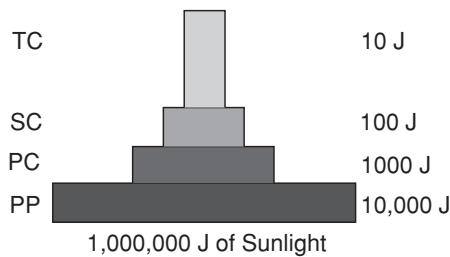
**Nutrient Cycling**

49. Each trophic level has a certain mass of living material at a particular time called
- (a) Standing state
  - (b) Stranding crop
  - (c) Ecological pyramid
  - (d) GPP
50. Stranding crop is measured in terms of
- (a) Biomass/unit area
  - (b) Number of organism/unit area
  - (c) Both (a) or (b)
  - (d) None of these
51. Measurement of biomass is generally done in terms of
- (a) Fresh weight
  - (b) Dry weight
  - (c) Ash
  - (d) Numbers of organisms
52. What does A represent in the diagram?

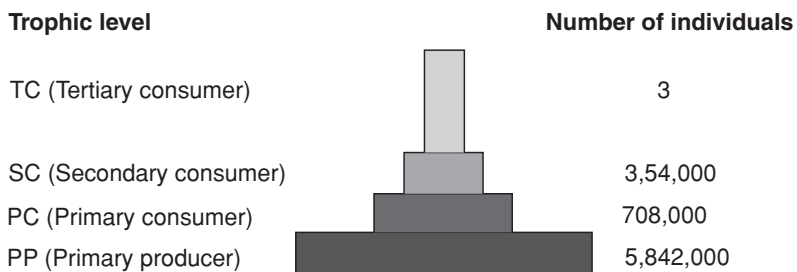




53. Transfer of energy in trophic level follows  
 (a) 20% law (b) 10% law (c) 5% law (d) 15% law
54. A graphical representation known as \_\_\_\_\_ is required to express food or energy relationship between organisms at different trophic levels.  
 (a) Ecological pyramid (b) Standing state  
 (c) Ecological quadrilateral (d) Standing crop
55. Ecological pyramids are based on  
 (a) Food chain (b) Food web  
 (c) Energy flow (d) All of these
56. How many ecological pyramids are usually studied?  
 (a) 1 (b) 2 (c) 3 (d) 4
57. Ecological pyramids are  
 (a) Pyramids of number (b) Pyramids of biomass  
 (c) Pyramids of energy (d) All the above
58. Which of the following pyramid is always upright?  
 (a) Energy (b) Biomass  
 (c) Number (d) All of these
59. How much energy of sunlight is converted by primary producers into NPP in the above energy pyramid?



- (a) 2% (b) 10% (c) 1% (d) 110%
60. How many top-carnivores are supported in an above grassland ecosystem based on production of nearly 6 million plants?



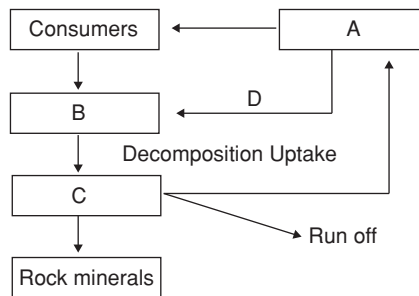
- (a) 3 (b) 6 (c) 9 (d) 12

61. An inverted pyramid of biomass is seen in
- (a) Forest ecosystem
  - (b) Grassland ecosystem
  - (c) Aquatic ecosystem
  - (d) Desert
62. Find out the correct statement:
- (a) Trophic level represents a functional level, not a species as such.
  - (b) A given species never occupies more than one trophic level in the same ecosystem at the same time.
  - (c) In most of the ecosystems, producers are less in number and biomass than the herbivores.
  - (d) Pyramid of energy can never be upright.
63. Which of the following are limitations of ecological pyramids?
- (a) It does not take into account the same species belonging to two or more trophic levels.
  - (b) It assumes a simple food chain that almost does not exist in nature.
  - (c) Saprophytes are not given at any place.
  - (d) All the above
64. Which of the following may occupy more than one trophic level in the same ecosystem at the same time?
- (a) Lion
  - (b) Sparrow
  - (c) Snake
  - (d) Frog
65. Which of these are true about sparrows?
- (a) When it eats seeds and peas, it is a primary consumer.
  - (b) When it eats insects and worms, it is a secondary consumer.
  - (c) It may occupy more than one trophic level in same ecosystem at the same time.
  - (d) All the above
66. Which of the following organisms have no space in ecological pyramid although they play vital role in the ecosystem?
- (a) Birds
  - (b) Snake
  - (c) Bacteria and fungi
  - (d) Frog
67. Orderly and sequential changes in communities, parallel with the changes in the physical environment is known as
- (a) Ecological succession
  - (b) Extinction
  - (c) Divergent evolution
  - (d) Convergent evolution
68. The entire sequence of communities that successively change in a given area are called
- (a) Extinction
  - (b) Evolution
  - (c) Succession
  - (d) Sere
69. In the successive seral stages
- (a) There is change in diversity of species of organisms.
  - (b) Increase in number of species occurs.
  - (c) Increase in biomass occurs.
  - (d) All the above
70. If succession occurs on bare rock, it is known as
- (a) Primary succession
  - (b) Secondary succession
  - (c) Tertiary succession
  - (d) Quaternary succession

71. Primary succession occurs on/in
- (a) Bare rocks (b) Newly cooled lava  
(c) Newly created pond (d) All of these
72. Secondary succession occurs in:
- (a) Flooded land (b) Burned forest  
(c) Abandoned farm land (d) All of these
73. How is primary succession different from secondary succession?
- (a) There is change in type of animals and plants during primary succession only.  
(b) Anthropogenic disturbance can change seral stages in primary succession only.  
(c) Primary succession occurs at slower rate.  
(d) All the above
74. What happened during succession?
- (a) Extinction of some species (b) Increase in number of some species  
(c) Change in type of decomposer species (d) All of these
75. In secondary succession the species that invades an area depend on
- (a) Soil condition (b) Water availability  
(c) Seed or propagules present (d) All of these
76. In which succession is the climax reached faster?
- (a) Succession on bare rock (b) Succession on burned forest  
(c) Succession on newly cooled lava (d) All of these
77. Which is correct order of seral stages in hydrarch?
- (a) Phytoplankton–submerged plant–submerged free floating plant stage–reed swamp stage–marsh-meadow stage–scrub stages–forest  
(b) Scrub stages–forest–reed swamp stage–marsh-meadow stage–submerged free floating plant stage–submerged plant–phytoplankton  
(c) Submerged plant–marsh-meadow stage–scrub stages–forest–phytoplankton–submerged free floating plant stage–reed swamp stage  
(d) Phytoplankton–reed swamp stage–scrub stages–forest–submerged plant–submerged free floating plant stage–marsh-meadow stage
78. Which is a pioneer species in primary succession on rocks?
- (a) Algae (b) Lichens (c) Bryophyte (d) Pteridophyte
79. A. Lichens are pioneer species on rocks.  
R. They secrete acids to dissolve rocks, it helps in weathering and soil formation.
- (a) A and R are both correct (b) A and R are both incorrect  
(c) A is correct but R is incorrect (d) R is correct but A is incorrect
80. Find out the total number of true statements from the following.
- (A) Primary succession is a very slow process, taking thousands of years for the climax to be reached.  
(B) All succession whether taking place in water or land, proceeds to a similar climax community, the mesic.  
(C) As succession proceeds, the number and types of animals and decomposers also change.  
(D) Saprophytes are not given at any place in the ecological pyramids even though they play a vital role in the ecosystem.

- (a) 1 (b) 2  
(c) 3 (d) 4
81. The amount of nutrients such as carbon, nitrogen, phosphorus, calcium, etc., present in the soil at any given time is referred to as  
(a) Standing state (b) Standing crop (c) Hydrarch (d) Xerarch
82. Nutrient cycling is known as  
(a) Biogeochemical cycle (b) Calvin cycle  
(c) Hatch–slack pathway (d) Krebs cycle
83. Standing state  
(a) Vary according to the type of ecosystem (b) Vary on seasonal basis  
(c) Both (a) and (b) (d) None of these
84. How many types of nutrient cycles are there?  
(a) 1 (b) 2 (c) 3 (d) 4
85. The following elements shows gaseous type of nutrient cycles except  
(a) Carbon (b) Nitrogen (c) Oxygen (d) Phosphorus
86. Which of the following factors regulate the release of nutrients into the atmosphere?  
(a) Soil and moisture (b) pH  
(c) Temperature (d) All of these
87. Which nutrients flows through the sedimentary cycle?  
(a) Sulphur (b) Phosphorus  
(c) Both (a) and (b) (d) Carbon
88. What percentage of the dry weight of an organism does carbon constitute?  
(a) 60% (b) 90% (c) 49% (d) 35%
89. What percentage of global carbon does the atmosphere contain?  
(a) 48% (b) 71% (c) 1% (d) 10%
90. How much carbon is fixed approximately in biosphere annually through the process of photosynthesis?  
(a)  $4 \times 10^{13}$  kg (b)  $4 \times 10^{10}$  kg  
(c)  $4 \times 10^8$  kg (d)  $4 \times 10^{20}$  kg
91. Which of the following majorly regulates the amount of  $\text{CO}_2$  in the atmosphere?  
(a) Respiratory activities of the producers and consumers  
(b) Decomposers  
(c) Burning of fossil fuel  
(d) Oceanic reservoir
92. Human activities mainly influence the  
(a) Carbon cycle (b) Nitrogen cycle  
(c) Phosphorus cycle (d) Sulphur cycle
93. Phosphorus is a major constituent of  
(a) Biological membrane (b) Nucleic acids  
(c) Cellular energy transfer system (d) All of these

94. Which of the following are the differences between carbon and phosphorus cycle?
- Carbon cycle is sedimentary whereas phosphorus cycle is gaseous.
  - Carbon cycle is not significantly affected by human activities whereas phosphorus is significantly affected.
  - Carbon has respiratory release but not phosphorus.
  - All the above
95. A chart is given to represent the phosphorus cycle in a terrestrial ecosystem. Find out what A, B, C and D represents in the flow chart.



- A—Producers, B—Detritus, C—Soil solution, D—Litter fall
  - A—Litter fall, B—Soil solution, C—Detritus, D—Producers
  - A—Detritus, B—Producers, C—Litter fall, D—Soil solution
  - A—Soil solution, B—Litter fall, C—Litter fall, D—Detritus
96. What price tag did Robert Costanza put for fundamental ecosystem services?
- 33 trillion US \$
  - 22 trillion US \$
  - 11 trillion US \$
  - 44 trillion US \$
97. Global GNP is about:
- 33 trillion US \$
  - 18 trillion US \$
  - 12 trillion US \$
  - 22 trillion US \$
98. Out of the total cost of various ecosystem services, the soil account for \_\_\_\_\_ %, recreation and nutrient cycling are less than \_\_\_\_\_ % and climate regulation and habitat for wildlife is about \_\_\_\_\_ % each.
- 50, 6, 10
  - 50, 10, 6
  - 50, 30, 20
  - 20, 30, 50
99. Which one of the following has the largest population in a food chain?
- Producers
  - Primary consumers
  - Secondary consumers
  - Decomposers
100. Which of the following are ecosystem services?
- Purification of air and water by forest
  - Crop pollination
  - Nutrient cycling
  - All of these
101. Which of the following are the two main structural features of an ecosystem?
- Species composition
  - Energy flow
  - Decomposition
  - Stratification

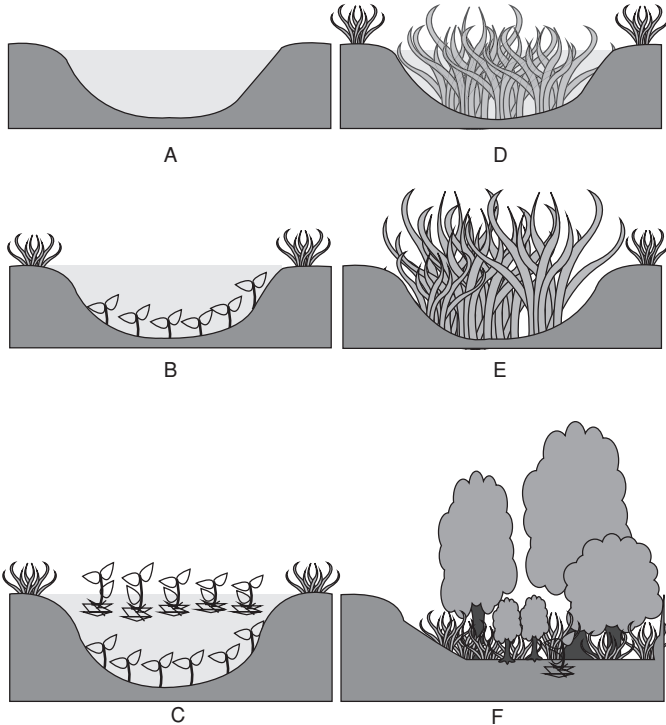
- (a) A and D only  
(b) B and C only  
(c) A only  
(d) B, C and D only
102. Which of the following are the reservoir of gaseous cycle?  
(a) Atmosphere  
(b) Earth crust  
(c) Hydrosphere  
(d) Both (a) and (c)
103. Which of the following nutrient cycle is the most complex?  
(a) Nitrogen cycle  
(b) Phosphorous cycle  
(c) Carbon cycle  
(d) Oxygen cycle
104. Biotic community is  
(a) Static  
(b) Dynamic  
(c) Group of population of same species in a given area  
(d) All the above
105. The stage of succession represented in the diagram is



- (a) Reed swamp stage  
(b) Scrub stage  
(c) Marsh-meadow stage  
(d) Forest stage
106. Litter is decomposed by how many organisms among the following?  
*Earthworm, Bacteria, Fungi, Mites*  
(a) 1  
(b) 2  
(c) 3  
(d) 4
107. The following are ecosystem services except  
(a) Maintain biodiversity  
(b) Crop pollination  
(c) Storage site for carbon  
(d) Flood
108. In decomposition, complex organic compounds of detritus are converted to which of the following substances by decomposers?  
(a) Carbon dioxide  
(b) Water  
(c) Inorganic nutrients  
(d) All of these

109. Driving force for an ecosystem is  
(a) Primary producers (b) Secondary producers  
(c) Solar radiation (d) Food chain
110. Frog, snake and eagle belongs to  
(a) Three trophic levels (b) Two trophic levels  
(c) Only one trophic level (d) None of these
111. Ecosystem shows  
(a) Homeostasis (b) Mineral cycling  
(c) Energy flow (d) All of these
112. Diagrammatic representation of different trophic levels of an ecosystem presents  
(a) Energy flow (b) Mineral cycling  
(c) Food chain and food web (d) Ecological pyramids
113. A plant eaten by a herbivorous animal which in turn is eaten by a carnivorous animal forms a  
(a) Food web (b) Food chain  
(c) Food pyramid (d) Food cycle
114. Which of the following statements is correct?  
(a) Producers produce energy (b) Consumers consume energy  
(c) Decomposers decompose energy (d) Producers transform energy
115. Food chain operating on decaying cow dung or organic remains is referred to as  
(a) Secondary succession (b) Secondary food chain  
(c) Food web (d) Detritus food chain
116. Biological equilibrium is maintained with the help of  
(a) Producers and consumers (b) Consumers and decomposers  
(c) Herbivores and carnivores (d) Photosynthesis and respiration
117. In ecosystem, the nonliving components are  
(a) Less important than the living components.  
(b) Equally important as those of the living components.  
(c) More important than living components.  
(d) None of the above
118. Cycling of material in ecosystem is entirely dependent upon  
(a) Producers and consumers (b) Primary producers and herbivores  
(c) Herbivores and carnivores (d) Producers and decomposers
119. In a terrestrial ecosystems such as forests, maximum energy is found in which trophic level?  
(a)  $T_1$  (b)  $T_2$   
(c)  $T_3$  (d)  $T_4$
120. Trophic levels are formed by  
(a) Only plants (b) Only animals  
(c) Only carnivores (d) Organisms linked in food chains
121. If 20 kJ energy is available at producer level, then how much energy will be transferred to the lion in the food chain: producer  $\rightarrow$  deer  $\rightarrow$  lion?  
(a) 0.2 J (b) 0.02 J (c) 0.002 J (d) 2 J

122. Select the correct match for the below given stages of succession.



- (a) A: Phytoplankton, B: Submerged plant, C: Submerged free floating plant stage, D: Reed swamp stage, E: Marsh-meadow stage, F: Scrub stages
- (b) A: Marsh-meadow stage, B: Submerged free floating plant stage, C: Scrub stages, D: Phytoplankton, E: Submerged plant, F: Reed swamp stage
- (c) A: Scrub stages, B: Marsh-meadow stage, C: Phytoplankton, D: Reed swamp stage, E: Submerged plant, F: Submerged free floating plant stage
- (d) A: Scrub stages, B: Phytoplankton, C: Reed swamp stage, D: Marsh-meadow stage, E: Submersed free floating pant stage, F: Submerged plant

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

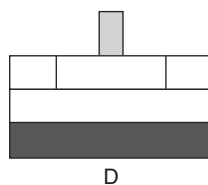
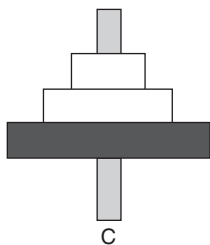
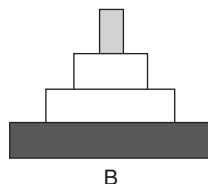
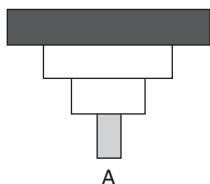


- 123. Assertion:** Forest, grassland and desert are examples of terrestrial ecosystem.  
**Reason:** Ecosystem is a functional unit of nature.
- 124. Assertion:** Vertical distribution of different species occupying different levels is called stratification.  
**Reason:** Tree occupy top vertical strata of forest.
- 125. Assertion:** Secondary productivity is defined as the rate of formation of new organic matter by producers.  
**Reason:** Secondary productivity = GPP – R.
- 126. Assertion:** Decomposers break down complex organic matter into inorganic substances like CO<sub>2</sub>, H<sub>2</sub>O and nutrients.  
**Reason:** Detritivore breakdown detritus into smaller particles.
- 127. Assertion:** Of the incident solar radiation is less than 50 per cent of its PAR.  
**Reason:** Plant captures 2 to 10 per cent of the PAR.
- 128. Assertion:** Biomass of a species is expressed in terms of dry weight in more accurate than fresh weight.  
**Reason:** Fresh weight is affected by environment condition.
- 129. Assertion:** Pyramid of energy is always upright.  
**Reason:** Energy flow is unidirectional and some energy is always lost as heat at each step.
- 130. Assertion:** Gradual and fairly predictable change in the species composition of a given area is called succession.  
**Reason:** Succession and evolution are same.
- 131. Assertion:** Secondary succession is faster than primary succession.  
**Reason:** Some soil or sediments are present.
- 132. Assertion:** Phosphorus cycle is sedimentary cycle.  
**Reason:** Reservoir of phosphorus located in earth's crust.
- 133. Assertion:** Length of food chain is limited.  
**Reason:** Energy hypothesis explain it because of inefficiency of energy transfer along the chain.
- 134. Assertion:** Ecosystem is an open system.  
**Reason:** Ecosystem exchange mass as well as energy from surrounding.
- 135. Assertion:** Despite occupying about 70% of surface, the productivity of oceans is only 55 million to us.  
**Reason:** Light and minerals are limiting factor for productivity of ocean.
- 136. Assertion:** The pyramid of biomass in sea is generally inverted.  
**Reason:** The biomass of fishes far exceeds that of phytoplankton.
- 137. Assertion:** The energy pyramid is always upright.  
**Reason:** Some energy is always lost as heat at each step when energy flows from a particular trophic level to the next trophic level.

- 138. Assertion:** In primary succession on rocks pioneer species are usually lichens.  
**Reason:** They are able to secrete acids to dissolve rocks helping in weathering and soil formation.
- 139. Assertion:** Amount of nutrient present in the soil at any given time, in a given ecosystem is referred as the standing state.  
**Reason:** Each trophic level has a certain mass of living material at particular time is known as the standing crop.
- 140. Assertion:** In terrestrial ecosystem, a large amount of energy passes through detritus food chain.  
**Reason:** Energy for detritus food chain comes from sun.

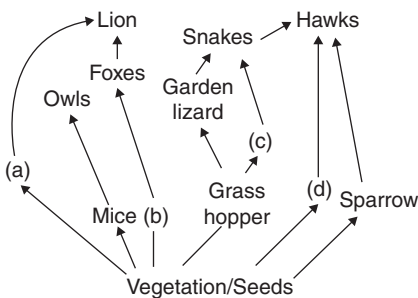
### PREVIOUS YEAR QUESTIONS

1. Which of the following representations shows the pyramid of numbers in a forest ecosystem?



- (a) D                      (b) A                      (c) B                      [AIPMT MAINS 2010]  
 (d) C
2. The biomass available for consumption by the herbivores and the decomposers is called  
 [AIPMT PRE 2010]  
 (a) Net primary productivity                      (b) Secondary productivity  
 (c) Standing crop                      (d) Gross primary productivity
3. Which one of the following animals may occupy more than one trophic levels in the same ecosystem at the same time?  
 [AIPMT MAINS 2011]  
 (a) Sparrow                      (b) Lion                      (c) Goat                      (d) Frog
4. Both hydrarch and xerarch successions lead to  
 [AIPMT MAINS 2011]

- (a) Medium water conditions (b) Xeric conditions  
(c) Highly dry conditions (d) Excessive wet conditions
5. The breakdown of detritus into smaller particles by earthworm is a process called [AIPMT MAINS 2011]  
(a) Humification (b) Fragmentation  
(c) Mineralization (d) Catabolism
6. Which of the following statements is correct for secondary succession? [AIPMT PRE 2011]  
(a) It occurs on a deforested site  
(b) It follows primary succession  
(c) It is similar to primary succession except that it has a relatively fast pace  
(d) It begins on a bare rock
7. Which one of the following statements for pyramid of energy is incorrect, whereas the remaining three are correct? [AIPMT PRE 2011]  
(a) It shows energy content of different trophic level organisms  
(b) It is inverted in shape  
(c) It is upright in shape  
(d) Its base is broad
8. Mass of living matter at a trophic level in an area at any time is called [AIPMT PRE 2011]  
(a) Detritus (b) Humus  
(c) Standing state (d) Standing crop
9. Of the total incident solar radiation the proportion of PAR is [AIPMT PRE 2011]  
(a) About 60% (b) Less than 50%  
(c) More than 80% (d) About 70%
10. The rate of formation of new organic matter by rabbit in a grassland is called [AIPMT MAINS 2012]  
(a) Secondary productivity (b) Net primary productivity  
(c) Gross primary productivity (d) Net productivity
11. Identify the likely organisms (a), (b), (c) and (d) in the food web shown below:



[AIPMT MAINS 2012]

**Options:**

- (a) A: Dog, B: Squirrel, C: Bat, D: Deer      (b) A: Rat, B: Dog, C: Tortoise, D: Crow  
 (c) A: Squirrel, B: Cat, C: Rat, D: Pigeon      (d) A: Deer, B: Rabbit, C: Frog, D: Rat

12. The second stage of hydrosere is occupied by plants like [AIPMT MAINS 2012]

- (a) Typha                      (b) Salix                      (c) Vallisneria                      (d) Azoll

13. Which one of the following is not a gaseous biogeochemical cycle in ecosystem? [AIPMT PRE 2012]

- (a) Sulphur cycle                      (b) Phosphorus cycle  
 (c) Nitrogen cycle                      (d) Carbon cycle

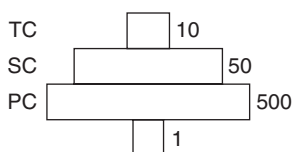
14. Identify the possible link 'A' in the following feed chain

Plant → insect → Frog → "A" → Eagle

[AIPMT PRE 2012]

- (a) Rabbit                      (b) Wolf                      (c) Cobra                      (d) Parrot

15. Given below is an imaginary pyramid of numbers. What could be one of the possibilities about certain organisms at some of the different levels?



[AIPMT PRE 2012]

- (a) Level PC is 'insects' and level SC is 'small insectivorous birds'.  
 (b) Level PP is 'phytoplanktons' in sea and 'whale' on top level TC.  
 (c) Level one PP is 'pipal trees' and the level SC is 'sheep'.  
 (d) Level PC is 'rats' and level SC is 'cats'.

16. Which one of the following is not a functional unit of an ecosystem?

[AIPMT PRE 2012]

- (a) Energy flow                      (b) Decomposition  
 (c) Productivity                      (d) Stratification

17. The upright pyramid of number is absent in

[AIPMT PRE 2012]

- (a) Pond                      (b) Forest  
 (c) Lake                      (d) Grassland

18. Natural reservoir of phosphorus is

[AIPMT 2013]

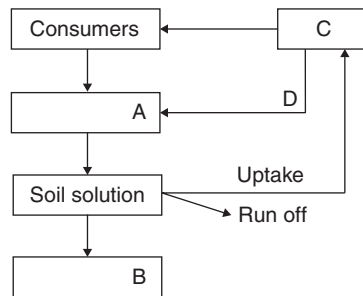
- (a) Sea water                      (b) Animal bones  
 (c) Rock                      (d) Fossils

19. Secondary productivity is the rate of formation of none organic matter by

[AIPMT 2013]

- (a) Producer                      (b) Parasite  
 (c) Consumer                      (d) Decomposer

20. Which one of the following processes during decomposition is correctly described? [AIPMT 2013]
- Fragmentation – Carried out by organisms such as earthworm.
  - Humification – Leads to the accumulation of a dark coloured substance humus which undergoes microbial action at a very fast rate.
  - Catabolism – Last step in the decomposition under fully anaerobic condition.
  - Leaching – Water soluble inorganic nutrients rise to the top layers of soil.
21. Given below is a simplified model of phosphorus cycling in a terrestrial ecosystem, with four blanks (A to D). Identify the blanks. [AIPMT 2014]



- A: Rock minerals, B: Detritus, C: Litter fall, D: Producers
  - A: Litter fall, B: Producers, C: Rock minerals, D: Detritus
  - A: Detritus, B: Rock minerals, C: Producers, D: Litter fall
  - A: Producers, B: Litter fall, C: Rock minerals, D: Detritus
22. Match the following and select the correct option:
- | Column – I            | Column – II         |
|-----------------------|---------------------|
| (A) Earthworm         | (1) Pioneer species |
| (B) Succession        | (2) Detritivore     |
| (C) Ecosystem service | (3) Nataly          |
| (D) Population growth | (4) Pollination     |
- (a) A:1, B:2, C:3, D:4  
 (b) A:4, B:1, C:3, D:2  
 (c) A:3, B:2, C:4, D:1  
 (d) A:2, B:1, C:4, D:3
23. If 20 J of energy is trapped at producer level, then how much energy will be available to peacock as food in the following chain? [AIPMT 2014]
- Plant → mice → snake → peacock
- 0.02 J
  - 0.002 J
  - 0.2 J
  - 0.0002 J
24. Secondary succession takes place on/in [AIPMT 2015]
- Bare rock
  - Degraded forest
  - Newly created pond
  - Newly cooled lava

25. The mass of living material at a trophic level at a particular time is called [AIPMT 2015]  
 (a) Gross primary productivity (b) Standing state  
 (c) Net primary productivity (d) Standing crop
26. In an ecosystem the rate of production of organic matter during photosynthesis is termed as [AIPMT 2015]  
 (a) Net primary productivity  
 (b) Gross primary productivity  
 (c) Secondary productivity  
 (d) Net productivity
27. What happens during ecological succession? [RE-AIPMT 2015]  
 (a) The establishment of a new biotic community is very fast in its primary phase.  
 (b) The numbers and types of animals remain constant.  
 (c) The changes lead to a community that is in near equilibrium with the environment and is called pioneer community.  
 (d) The gradual and predictable change in species composition occurs in a given area.
28. Most of the animals that live in deep oceanic waters are [RE-AIPMT 2015]  
 (a) Secondary consumers  
 (b) Tertiary consumers  
 (c) Detritivore  
 (d) Primary consumers
29. In which of the following both pairs have correct combination? [RE-AIPMT 2015]
- |     |                            |                         |
|-----|----------------------------|-------------------------|
| (a) | Gaseous nutrient cycle     | Carbon and sulphur      |
|     | Sedimentary nutrient cycle | Nitrogen and phosphorus |
| (b) | Gaseous nutrient cycle     | Nitrogen and sulphur    |
|     | Sedimentary nutrient cycle | Carbon and phosphorus   |
| (c) | Gaseous nutrient cycle     | Sulphur and phosphorus  |
|     | Sedimentary nutrient cycle | Carbon and nitrogen     |
| (d) | Gaseous nutrient cycle     | Carbon and nitrogen     |
|     | Sedimentary nutrient cycle | Sulphur and phosphorus  |
30. Which of the following is a characteristic feature of cropland ecosystem? [NEET - I, 2016]  
 (a) Absence of soil organisms (b) Least genetic diversity  
 (c) Absence of weeds (d) Ecological succession
31. The term ecosystem was coined by: [NEET - I, 2016]  
 (a) E. P. Odum (b) A.G. Tansley  
 (c) E. Haeckel (d) E. Warming
32. Which of the following is correctly matched? [NEET - II, 2016]  
 (a) Age pyramid-Biome  
 (b) Parthenium hysterophorus – heart to biodiversity

- (c) Stratification-Population  
(d) Aerenchyma-Opuntia

### NCERT EXEMPLAR QUESTIONS

- Decomposers like fungi and bacteria are
  - Autotrophs
  - Heterotrophs
  - Saprotrophs
  - Chemoautotrophs
 Choose the correct answer:  
 (a) i and iii                      (b) i and iv                      (c) ii and iii                      (d) i and ii
- The process of mineralization by microorganisms helps in the release of
  - Inorganic nutrients from humus.
  - Both organic and inorganic nutrients from detritus.
  - Organic nutrients from humus.
  - Inorganic nutrients from detritus and formation of humus.
- Productivity is the rate of production of biomass expressed in terms of
  - $(\text{kcal m}^{-3}) \text{ yr}^{-1}$
  - $\text{g}^{-2} \text{ yr}^{-1}$
  - $\text{g}^{-1} \text{ yr}^{-1}$
  - $(\text{kcal m}^{-2}) \text{ yr}^{-1}$
 (a) ii                                      (b) iii  
 (c) ii and iv                              (d) i and iii
- An inverted pyramid of biomass can be found in which ecosystem?
  - Forest
  - Marine
  - Grassland
  - Tundra
- Which of the following is not a producer?
  - Spirogyra*
  - Agaricus*
  - Volvox*
  - Nostoc*
- Which of the following ecosystems is more productive in terms of net primary production?
  - Deserts
  - Tropical rain forests
  - Oceans
  - Estuaries
- Pyramid of numbers is
  - Always upright
  - Always inverted
  - Either upright or inverted
  - Neither upright nor inverted
- Approximately how much of the solar energy that falls on the leaves of a plant is converted to chemical energy by photosynthesis?
  - Less than 1%
  - 2 to 10%
  - 30%
  - 50%
- Among the following, where do you think the process of decomposition would be the fastest?
  - Tropical rain forest
  - Antarctic
  - Dry arid region
  - Alpine region

10. How much of the net primary productivity of a terrestrial ecosystem is eaten and digested by herbivores?  
(a) 1%                      (b) 10%                      (c) 40%                      (d) 90%
11. During the process of ecological succession the changes that take place in communities are  
(a) Orderly and sequential  
(b) Random  
(c) Very quick  
(d) Not influenced by the physical environment
12. Climax community is in a state of  
(a) Non-equilibrium                      (b) Equilibrium  
(c) Disorder                      (d) Constant change
13. Among the following biogeochemical cycles which one does not have losses due to respiration?  
(a) Phosphorus                      (b) Nitrogen                      (c) Sulphur                      (d) All of the above
14. The sequence of communities of primary succession in water is  
(a) Phytoplankton, sedges, free-floating hydrophytes, rooted hydrophytes, grasses and trees.  
(b) Phytoplankton, free-floating hydrophytes, rooted hydrophytes; sedges, grasses and trees.  
(c) Free-floating hydrophytes, sedges, phytoplankton, rooted hydrophytes, grasses and trees.  
(d) Phytoplankton, rooted submerged hydrophytes, floating hydrophytes, reed swamp, sedges, meadow and trees.
15. The reservoir for the gaseous type of biogeochemical cycle exists in  
(a) Stratosphere                      (b) Atmosphere  
(c) Ionosphere                      (d) Lithosphere
16. Which of the following type of ecosystem is expected in an area where evaporation exceeds precipitation and the mean annual rainfall is below 100 mm  
(a) Grassland                      (b) Shrubby forest  
(c) Desert                      (d) Mangrove
17. The zone at the edge of a lake or ocean which is alternatively exposed to air and immersed in water is called  
(a) Pelagic zone                      (b) Benthic zone                      (c) Lentic zone                      (d) Littoral zone
18. If the carbon atoms fixed by producers already have passed through three species, then the trophic level of the last species would be  
(a) Scavenger                      (b) Tertiary producer  
(c) Tertiary consumer                      (d) Secondary consumer
19. Edaphic factor refers to  
(a) Water                      (b) Soil                      (c) Relative humidity                      (d) Altitude
20. Which of the following is an ecosystem service provided by a natural ecosystem?  
(a) Cycling of nutrients  
(b) Prevention of soil erosion  
(c) Pollutant absorption and reduction of the threat of global warming  
(d) All of the above



### Answer Keys

#### *Practice Questions*

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (b)   | 2. (d)   | 3. (d)   | 4. (d)   | 5. (c)   | 6. (a)   | 7. (d)   | 8. (d)   | 9. (c)   | 10. (a)  |
| 11. (c)  | 12. (b)  | 13. (b)  | 14. (d)  | 15. (b)  | 16. (c)  | 17. (a)  | 18. (b)  | 19. (c)  | 20. (b)  |
| 21. (c)  | 22. (c)  | 23. (d)  | 24. (d)  | 25. (a)  | 26. (d)  | 27. (d)  | 28. (b)  | 29. (d)  | 30. (b)  |
| 31. (a)  | 32. (a)  | 33. (a)  | 34. (d)  | 35. (a)  | 36. (d)  | 37. (b)  | 38. (d)  | 39. (a)  | 40. (a)  |
| 41. (a)  | 42. (c)  | 43. (b)  | 44. (b)  | 45. (c)  | 46. (d)  | 47. (b)  | 48. (a)  | 49. (b)  | 50. (c)  |
| 51. (b)  | 52. (b)  | 53. (b)  | 54. (a)  | 55. (a)  | 56. (c)  | 57. (d)  | 58. (a)  | 59. (c)  | 60. (a)  |
| 61. (c)  | 62. (a)  | 63. (d)  | 64. (b)  | 65. (d)  | 66. (c)  | 67. (a)  | 68. (d)  | 69. (d)  | 70. (a)  |
| 71. (d)  | 72. (d)  | 73. (c)  | 74. (d)  | 75. (d)  | 76. (b)  | 77. (a)  | 78. (b)  | 79. (a)  | 80. (d)  |
| 81. (a)  | 82. (a)  | 83. (c)  | 84. (b)  | 85. (d)  | 86. (d)  | 87. (c)  | 88. (c)  | 89. (c)  | 90. (a)  |
| 91. (d)  | 92. (a)  | 93. (d)  | 94. (c)  | 95. (a)  | 96. (a)  | 97. (b)  | 98. (b)  | 99. (a)  | 100. (d) |
| 101. (a) | 102. (d) | 103. (a) | 104. (b) | 105. (b) | 106. (d) | 107. (d) | 108. (d) | 109. (c) | 110. (a) |
| 111. (d) | 112. (d) | 113. (b) | 114. (d) | 115. (d) | 116. (d) | 117. (b) | 118. (d) | 119. (a) | 120. (d) |
| 121. (a) | 122. (a) |          |          |          |          |          |          |          |          |

#### *Assertion and Reason Questions*

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 123. (b) | 124. (b) | 125. (c) | 126. (b) | 127. (b) | 128. (a) | 129. (a) | 130. (c) | 131. (a) | 132. (a) |
| 133. (a) | 134. (a) | 135. (a) | 136. (a) | 137. (a) | 138. (a) | 139. (b) | 140. (c) |          |          |

#### *Previous Year Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (a)  | 3. (a)  | 4. (a)  | 5. (b)  | 6. (a)  | 7. (b)  | 8. (d)  | 9. (b)  | 10. (a) |
| 11. (d) | 12. (c) | 13. (b) | 14. (c) | 15. (a) | 16. (d) | 17. (b) | 18. (c) | 19. (c) | 20. (a) |
| 21. (c) | 22. (d) | 23. (a) | 24. (b) | 25. (d) | 26. (b) | 27. (d) | 28. (c) | 29. (d) | 30. (b) |
| 31. (b) | 32. (b) |         |         |         |         |         |         |         |         |

#### *NCERT Exemplar Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (a)  | 3. (c)  | 4. (b)  | 5. (b)  | 6. (b)  | 7. (c)  | 8. (b)  | 9. (a)  | 10. (b) |
| 11. (a) | 12. (b) | 13. (d) | 14. (b) | 15. (b) | 16. (c) | 17. (d) | 18. (c) | 19. (b) | 20. (d) |

# Biodiversity and Conservation

## PRACTICE QUESTIONS

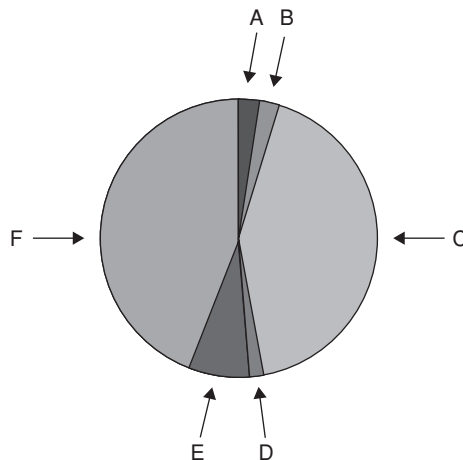
### Patterns of Biodiversity

1. Match Column-I (organism) with Column-II.

| Column-I   | Column-II<br>(number of species) |
|------------|----------------------------------|
| 1. Ants    | A. 20,000                        |
| 2. Orchids | B. 25,000                        |
| 3. Fishes  | C. 28,000                        |
| 4. Beetles | D. 3,00,000                      |

- (a) 1:D, 2:C, 3:B, 4:A  
(b) 1:B, 2:A, 3:C, 4:D  
(c) 1:A, 2:B, 3:C, 4:D  
(d) 1:A, 2:A, 3:C, 4:D
2. The term 'Biodiversity' was popularized by  
(a) Robert May  
(b) A. Von Humboldt  
(c) Edward Wilson  
(d) Paul Ehrlich
3. Identify the type/level of biodiversity from the following  
(a) Genetic  
(b) Species  
(c) Ecological  
(d) All of these
4. Which of the following shows maximum genetic diversity?  
(a) Rice  
(b) Mango  
(c) Rauwolfia vomitoria  
(d) Wheat
5. How many different varieties of mango are found in India?  
(a) 50,000  
(b) 5000  
(c) 2000  
(d) 1000
6. How many genetically different strains of rice are found in India?  
(a) 50,000  
(b) 5000  
(c) 2000  
(d) 1000
7. Choose the correct statement from the following.  
(A) Western Ghats have a greater amphibian species diversity than the Eastern Ghats.  
(B) Diversity exists at all levels of biological organization ranging from macromolecules within cells to biomes.  
(C) Rauwolfia Vomitoria shows genetic variation in terms of potency and concentration of the reserpine produced.  
(D) Norway has greater ecosystem diversity than India.  
(a) A and B only  
(b) B and D only  
(c) A, B and C only  
(d) D only

8. If the present rate of species losses continues, we will lose our biological wealth in how much time?  
 (a) Less than one century (b) Less than 2 centuries  
 (c) Less than 50 years (d) Next 20 years
9. Robert May places the global species diversity at about \_\_\_\_\_ million.  
 (a) 2 (b) 3  
 (c) 6 (d) 7
10. More than \_\_\_\_\_ % of all species recorded are animals.  
 (a) 60 (b) 70  
 (c) 90 (d) 10
11. Arrange the following in their decreasing order of species.  
*Fishes, Birds, Reptiles, Amphibian*  
 (a) Fishes > Birds > Reptiles > Amphibian (b) Fishes > Reptiles > Birds > Amphibian  
 (c) Reptiles > Fishes > Birds > Amphibian (d) Amphibian > Fishes > Birds > Reptiles
12. Which of the following have more number of species?  
 (a) Fungi (b) Mosses  
 (c) Angiosperm (d) Lichens
13. Which order is correct with respect to the number of species?  
 (a) Fungi > Algae > Lichens > Angiosperm (b) Angiosperm > Fungi > Algae > Lichen  
 (c) Fungi > Angiosperm > Algae > Lichen (d) Mosses > Ferns > Algae > Lichens
14. What does A, B, C, D, E and F represent in this figure?



$\pi$ -chart for number of species of major taxa of plants.

- (a) A: Ferns and allies, B: Mosses, C: Algae, D: Fungi, E: Lichens, F: Angiosperms  
 (b) A: Fungi, B: Mosses, C: Lichens, D: Ferns and allies, E: Angiosperms, F: Algae  
 (c) A: Angiosperms, B: Ferns and allies, C: Fungi, D: Lichens, E: Algae, F: Mosses  
 (d) A: Mosses, B: Ferns and allies, C: Angiosperms, D: Lichens, E: Algae, F: Fungi

15. Find the false statement.
- (a) The number of fungi species is more than the combined total of the species of fishes, amphibians, reptiles and mammals.
  - (b) Conventional taxonomic methods are not suitable for identifying microbial species.
  - (c) For many taxonomic groups, species inventories are more complete in temperate than in tropical countries.
  - (d) Insects forms 70 per cent part of all the species recorded.
16. Find the true statement.
- A. If we consider biochemical or molecular criteria for microorganisms, their diversity may run into millions.
  - B. There are 12 mega diversity countries in the world.
  - C. If we accept May's global estimates, only 32 per cent of the total species have been recorded so far.
  - D. Western Ghats have a greater amphibian species diversity than Eastern Ghats.
- (a) A and B only
  - (b) D only
  - (c) A and D only
  - (d) A, B and D only
17. India has only \_\_\_\_\_ percent of the world's land area; its share of the global species diversity is an impressive \_\_\_\_\_ percent.
- (a) 4.2, 1.8
  - (b) 2.4, 8.1
  - (c) 2.4, 13
  - (d) 4.2, 13

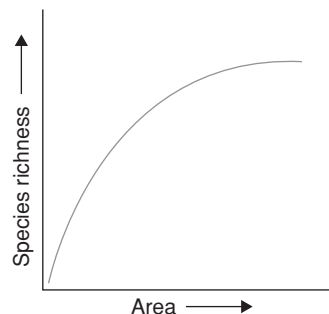
18. Match Column-I (Place) with Column-II (Number of bird species).

| Column-I                 | Column -II |
|--------------------------|------------|
| 1. Colombia              | A. 1200    |
| 2. New York              | B. 1300    |
| 3. India                 | C. 1400    |
| 4. Amazonian rain forest | D. 105     |

- (a) A:3, B:4, C:2, D:1
  - (b) A:2, B:1, C:4, D:3
  - (c) A:2, B:4, C:3, D:1
  - (d) A:3, B:4, C:1, D:2
19. Find the incorrect statement.
- (a) India has nearly 45,000 species of plants and twice as many animals.
  - (b) A forest in a tropical region like equator has 10 times as many species of vascular plants as a forest of equal area in a temperate region like the mid west of the USA.
  - (c) Greenland 71° N has only 56 species of birds.
  - (d) The diversity of plant and animals is uniform throughout the world.
20. The largely tropical Amazonian rain forest in South America has the greatest biodiversity on earth. It is the home for more than \_\_\_\_\_ species of plants. \_\_\_\_\_ of fishes, \_\_\_\_\_ of birds, \_\_\_\_\_ of mammals, \_\_\_\_\_ of amphibians, \_\_\_\_\_ of reptiles and of more than \_\_\_\_\_ invertebrates.
- (a) 30,000, 4000, 1200, 427, 427, 387, 1,25,000
  - (b) 40,000, 3000, 1200, 427, 427, 387, 1,25,000
  - (c) 40,000, 3000, 1300, 427, 427, 378, 1,25,000
  - (d) 40,000, 3000, 1200, 427, 427, 378, 1,25,000

21. What is the sum of the number of species of birds in New York 41° N and Greenland of 71° N.  
 (a) 112 (b) 161 (c) 170 (d) 56
22. Species richness of tropics is because of  
 (a) Tropics have more evolutionary time.  
 (b) Tropics have relatively constant environment.  
 (c) Tropics receive more solar energy.  
 (d) All the above
23. Species–area relationship was provided by  
 (a) Alexander Van Humboldt (b) Robert May  
 (c) Paul Ehrlich (d) Edward Wilson
24. The graph formed by plotting species richness against area for a wide variety of taxa (angiosperm plants, birds, bats, fresh water fishes, etc.) turns out to be a  
 (a) Parabola (b) Straight line  
 (c) Rectangular hyperbola (d) Any of the above
25.  $\log S = \log C + Z \log A$  (Logarithmic formula for species–area relationship). True about this formula  
 (a)  $S =$  Species richness  $A =$  Area (b)  $Z =$  Regression coefficient  
 (c)  $C =$  Y-intercept (d) All of these
26. If we analyze species–area relationship among very large area like entire continents, slope of line becomes  
 (a) Less steeper (b) Vertical  
 (c) Much steeper (d) Horizontal
27. Z-value in a much steeper slope ranges between  
 (a) 0.6 to 1.2 (b) 0.1 to 1.2  
 (c) 0.01 to 0.02 (d) 0.6 to 0.12
28. For frugivorous (fruit-eating) birds and mammals in the tropical forests of different continents, the slope of species–area relationship is found to be approximately  
 (a) 0.6 (b) 1.3 (c) 1.15 (d) 1
29. Which is the correct formula of the graph shown below? Given:

S-species richness  
 A-Area  
 C-Y-intercept  
 Z-Slope of line (regression coefficient)



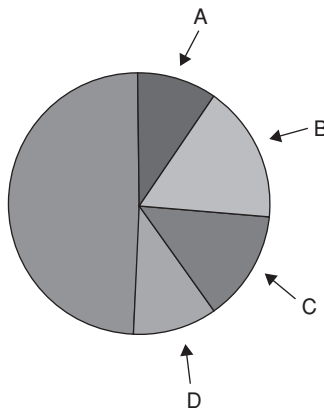
- (a)  $S = CA^Z$  (b)  $S = CZ^A$   
 (c)  $S = ZC^A$  (d)  $Z = SC^A$

30. 'Z' value in species–area relationship lies in the range of 0.1 to 0.2 for  
 (a) Plants in Britain (b) Birds in California  
 (c) Molluscs in New York State (d) All of these
31. Which of the followings are the features of a stable community?  
 (a) Resistant or resilient to occasional disturbances (Natural or Anthropogenic).  
 (b) Does not show much variation in productivity.  
 (c) Resistant to invasion by alien species.  
 (d) All the above
32. There are two plots Plot '1' has less species and Plot '2' has more species. Which statement is true regarding the two plots?  
 (a) Plot '1' shows less year to year variation in total biomass.  
 (b) Plot '2' is less resistant to natural disturbance.  
 (c) Plot '1' has more productivity than plot '2'.  
 (d) Plot '2' has more productivity than plot '1'.
33. Rivet popper hypothesis was proposed by  
 (a) Robert May (b) A. Von Humboldt  
 (c) Paul Ehrlich (d) Edward Wilson
34. Tropical environments, unlike temperate ones, are  
 (a) Less seasonal (b) Relatively more constant  
 (c) More predictable (d) All of these
35. Find the incorrect statement.  
 (a) Constant environment promote niche specialization.  
 (b) Key species are those which derive major ecosystem functions.  
 (c) Increase in diversity generally increases productivity.  
 (d) Increased steepness in species–area relationship curve decreases species richness in a given area.
36. The colonization of tropical Pacific Islands by humans led to the extinction of more than, \_\_\_\_\_ species of native birds  
 (a) 2000 (b) 50 (c) 4000 (d) 3000
37. IUCN Red list (2004) documents the extinction of how many species in last 500 years?  
 (a) 784 (b) 874 (c) 478 (d) 487
38. Match the Column- I (Recently extinct animals) with Column-II (Places from where they are extinct).

| Column-I             | Column-II    |
|----------------------|--------------|
| A. Dodo              | 1. Russia    |
| B. Quagga            | 2. Australia |
| C. Thylacine         | 3. Africa    |
| D. Steller's sea cow | 4. Mauritius |

- (a) A:1, B:2, C:3, D:4 (b) A:4, B:3, C:2, D:1  
 (c) A:4, B:2, C:3, D:1 (d) A:4, B:1, C:2, D:3

39. Find the false statement.
- (A) In the last 20 years alone there is a disappearance of 27 species.  
 (B) Three species (Bali, Javan and Caspian) of tiger are included in recently extinct animals.  
 (C) If we apply May's estimate then there are probably more than 1,00,000 plant species in India that are yet to be discovered and described.  
 (D) There is more solar energy available in tropics, which contribute to higher productivity; this in turn contributes directly to greater diversity.
- (a) A only (b) C, D only  
 (c) B, D only (d) A and C only
40. According to the IUCN Red list (2004) how many vertebrates became extinct in the last 550 years?  
 (a) 359 (b) 338 (c) 487 (d) 87
41. According to IUCN Red list (2004) how many invertebrates became extinct in the last 500 years?  
 (a) 359 (b) 338 (c) 784 (d) 87
42. Which group is most vulnerable to extinction?  
 (a) Fishes (b) Amphibians (c) Reptiles (d) Birds
43. Approximately how many species face the threat of extinction?  
 (a) 3000 (b) 1500 (c) 15,500 (d) 70,000
44. Presently \_\_\_\_\_% of all bird species, \_\_\_\_\_% of all mammals species, \_\_\_\_\_% of all amphibian species and \_\_\_\_\_% of all gymnosperm species in the world face the threat of extinction.  
 (a) 23, 32, 12, 31 (b) 12, 23, 32, 31  
 (c) 12, 23, 31, 32 (d) 23, 12, 32, 81
45. Since the origin and diversification of life on earth how many episodes of mass extinction of species have occurred till date?  
 (a) 2 (b) 3 (c) 4 (d) 5
46. What is A, B, C and D in this figure?



- $\pi$ -chart for number of species of major taxa of vertebrates
- (a) A: Mammals, B: Birds, C: Reptiles, D: Amphibians
  - (b) A: Amphibians, B: Birds, C: Mammals, D: Reptiles
  - (c) A: Reptiles, B: Amphibians, C: Birds, D: mammals
  - (d) A: Mammals, B: Reptiles, C: Birds, D: Amphibians
47. The current rate of species extinction is how many times faster than the pre-human time?
- (a) 10 to 50 times
  - (b) 100 to 1000 times
  - (c) 1000 to 10,000 times
  - (d) 10,000 to 1,00,000 times
48. Find the incorrect statement.
- (a) 'Sixth extinction' is different from previous extinction in terms of rate of extinction.
  - (b) Ecologist warn that if the present trend of extinction continues, nearly 50 per cent all species on earth might be wiped out within the next 100 years.
  - (c) Amphibians appear to be vulnerable to extinction.
  - (d) Recent extinction is completely natural.
49. Loss of biodiversity in a region may lead to
- (a) Decline in plants production.
  - (b) Lowered resistance to environmental perturbations such as draught.
  - (c) Increased variability in certain ecosystem processes such as plant productivity, water use, and pest and disease cycle.
  - (d) All the above
50. Which of the following is a major cause of loss of biodiversity?
- (a) Habitat loss and fragmentation
  - (b) Over-exploitation
  - (c) Alien species invasion
  - (d) Co-extinction
51. The most dramatic examples of habitat loss comes from the
- (a) Tropical rain forests
  - (b) Temperate forests
  - (c) Grasslands
  - (d) Deserts
52. Find the incorrect statement from the following.
- (A) Tropic rain forests cover around 6 per cent of earth's land surface.
  - (B) Amazonian rain forest is being cut and cleared for soya bean cultivation or for conversion to grasslands for raising beef cattle.
  - (C) Animals with migratory habits are badly affected by habitat loss and fragmentation.
  - (D) Mammals and birds require small territories.
- (a) A and B only
  - (b) A and D only
  - (c) D only
  - (d) B and C only
53. Steller's sea cow and Passenger pigeon became extinct due to
- (a) Alien species invasion
  - (b) Co-extinction
  - (c) Habitat loss and fragmentation
  - (d) Over exploitation
54. Which of these are examples of alien species invasion?
- (a) Nile perch was introduced in Lake Victoria in east Africa
  - (b) African catfish in Indian River
  - (c) Water hyacinth in India
  - (d) All the above



55. Which of these are invasive weeds?  
(a) Carrot grass (Parthenium) (b) Gandhari (lantana)  
(c) Water hyacinth (Eicchornia) (d) All of these
56. Co-extinction means  
(a) Introduction of alien species leading to decline or extinction of indigenous species.  
(b) Extinction due to over exploitation.  
(c) Extinction due to Habitat loss.  
(d) Extinction due to obligatory association of plant or animal.

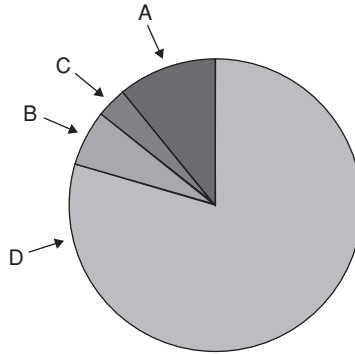
### **Biodiversity Conservation**

57. Which of these is not a narrowly utilitarian argument for conserving biodiversity?  
(a) Food (b) Medicine  
(c) Construction material (d) Pollination
58. All are examples of broadly utilitarian except  
(a) Pollination  
(b) Oxygen  
(c) Aesthetic pleasure of walking through thick woods  
(d) Firewood
59. Find the incorrect statement from the following.  
(a) Introduction of Nile perch in Lake Victoria in east Africa lead to the extinction of more than 200 species of cichlid fish in the lake.  
(b) Fast dwindling Amazon forest is estimated to produce, through photosynthesis, 20 per cent of the total oxygen in the earth's atmosphere.  
(c) More than 25 per cent of drugs currently sold worldwide are derived from plants.  
(d) Illegal introduction of American catfish *Clarias gariepinus* for aquaculture purpose is posing threat to indigenous cat fishes in our rivers.
60. 'We save the entire forest to save the tiger'. This approach of conservation is  
(a) *In situ* (b) *Ex situ* (c) *In vitro* (d) *In vivo*
61. What percentage of the earth's land area is covered by all biodiversity hotspots put together?  
(a) 6% (b) 10% (c) 2% (d) 15%
62. The following are examples of ex situ conservation except  
(a) Zoological parks (b) Botanical garden  
(c) Wildlife safari parks (d) Biosphere reserve
63. The following are examples of In situ conservation except?  
(a) Biosphere reserve (b) National park  
(c) Sacred groves (d) Gene-bank
64. Hotspots are characterized by  
(a) Very high species richness (b) High degree of endemism  
(c) Region of accelerated habitat loss (d) All of these
65. In India, ecologically unique and biodiversity rich regions are legally protected as  
(a) Biosphere reserve (b) National park  
(c) Sanctuaries (d) All of these

66. The Earth Summit (Historic Convention on Biological Diversity) was held in  
(a) Johannesburg, South Africa, 2002 (b) Rio De Janeiro, 1992  
(c) Kyoto, Japan (d) Montreal, Canada
67. World Summit on sustainable development was held in  
(a) Johannesburg, South Africa, 2002 (b) Rio De Janeiro, 1992  
(c) Kyoto, Japan (d) Montreal, Canada
68. Which of these are hotspots of India?  
(a) Western Ghats (b) Himalaya  
(c) Indo-Burma (d) All of these
69. Ex situ conservation includes  
(a) Cryopreservation of gametes (b) In vitro fertilization  
(c) Tissue culture (d) All of these
70. The reasons for biodiversity conservation are  
(a) Broad utilization (b) Narrow utilization  
(c) Ethical (d) All of these
71. The following are broadly utilitarian except  
(a) Pest control (b) Flood control  
(c) Climate moderation (d) Pharmaceuticals
72. In the World Summit on sustainable development held in 2002 in Johannesburg, South Africa, how many countries pledged their commitment to achieve a significant reduction in the current rate of biodiversity loss at global, regions and local levels, by 2010?  
(a) 100 (b) 180  
(c) 190 (d) 200
73. Sacred groves are present in  
(a) Khasi and Jaintia Hills in Meghalaya  
(b) Aravalli Hills of Rajasthan  
(c) Western Ghat regions of Karnataka and Maharashtra  
(d) All the above
74. How do ecologists estimate the total number of species present in the world?  
(a) By counting them all.  
(b) By counting the number of any one species and applying this to various genus.  
(c) By making statistical comparison of the temperate–tropical species richness of an exhaustively studied group of insects and extrapolating this ratio to other group of animals and plants.  
(d) By calculating biomass of all the species.
75. The species diversity of plants (22%) is much less than that of animals (72%), what could be the explanation to how animals achieved greater diversification?  
(a) Animal are non-motile.  
(b) Their movement to diverse habitats resulted in more evolutionary changes occurring in animals.  
(c) Animals use carbohydrate and lipid as a source of energy.  
(d) Animal DNA is different from plant DNA in terms of type of nitrogen bases.

76. Which extinction is presently in progress?  
 (a) Fifth (b) Sixth (c) Forth (d) Third

77. Identify A, B, C and D in this figure.



$\pi$ -chart for the number of species of major taxa of Invertebrates

- (a) A: Insects, B: Crustaceans, C: Molluscs, D: Other animal groups  
 (b) A: Other animal groups, B: Molluscs, C: Crustaceans, D: Insects  
 (c) A: Molluscs, B: Insects, C: Other animal groups, D: Crustaceans  
 (d) A: Insects, B: Molluscs, C: Crustaceans, D: Other animal groups
78. Which of the following require large territories?  
 (a) Birds (b) Amphibians  
 (b) Mammals (d) Both (a) and (c)
79. Presently which of the following face maximum threat of extinction?  
 (a) Birds (b) Amphibians  
 (c) Mammals (d) Gymnosperms
80. Loss of biodiversity in a region leads to increase in variability in certain ecosystem processes like  
 (a) Plant productivity (b) Water use  
 (c) Pest and disease cycle (d) All of these
81. Gametes of threatened species can be preserved in viable and fertile condition for long periods using  
 (a) PCR technique (b) CTAB  
 (c) Cryopreservation technique (d) In situ conservation
82. At present, how many biosphere reserves does India have?  
 (a) 11 (b) 14 (c) 17 (d) 20
83. How many biodiversity hotspots are found in the world?  
 (a) 25 (b) 34 (c) 9 (d) 20
84. Hotspot is a region of  
 (a) Endemism (b) Accelerated habitat loss  
 (c) Low level of species richness (d) Both (a) and (b)

85. The following are direct benefits from biodiversity except  
(a) Firewood (b) Fibre (c) Food (d) Pollination
86. The following are indirect benefits from biodiversity except  
(a) Pest control (b) Climate moderation  
(c) Flood control (d) Dyes, resins and perfumes
87. Which area of M.P. (Madhya Pradesh) contain sacred groves?  
(a) Sarguja (b) Chanda (c) Bastar (d) All of these
88. Find the incorrect match.  
(a) Pollinator – Bees, Bumblebees, Bats and Birds  
(b) Legally protected biodiversity rich region – Biosphere reserve, National park, wildlife sanctuaries, sacred groves  
(c) Lung of planet – Amazonian rain forest  
(d) Rivet popper hypothesis – Harvard ecologist Paul Ehrlich
89. Stellar's Sea cow became extinct from  
(a) Mauritius (b) Africa (c) Russia (d) Australia
90. Strict protection of hotspots can reduce ongoing mass extinction by  
(a) 20% (b) 30% (c) 40% (d) 50%

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

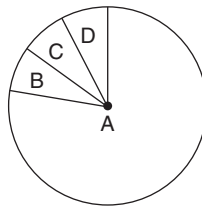
- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion .
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.
91. **Assertion:** Current estimates do not give any figure for prokaryotes taxonomic.  
**Reason:** Conventional taxonomic methods are not suitable for identifying microbial species.
92. **Assertion:** Tropics have greater biological diversity.  
**Reason:** Tropics have long evolutionary time for species diversification is one of the reasons.
93. **Assertion:** Stable community must be either resistant or resilient to occasional disturbances.  
**Reason:** Stable community not shows too much variation in productivity from year to year.
94. **Assertion:** Sixth extinction presently in progress different from the previous episode.  
**Reason:** Difference is in the rate; current species extinction rates are estimated to be 100 to 1000 times faster than in the pre-human times.
95. **Assertion:** Bioremediation is the use of living organisms, usually prokaryotes, fungi plants, to detoxify polluted ecosystems.  
**Reason:** Biological augmentation uses organisms to add essential materials to a degraded ecosystem.

96. **Assertion:** Steller's sea cow becomes extinct.  
**Reason:** It is due to over exploitation by humans.
97. **Assertion:** Biodiversity hotspots are example of in situ conservation.  
**Reason:** It is a conservation of biological wealth on site.
98. **Assertion:** Ex situ conservation is carried out in biosphere reserves, national parks and sanctuaries.  
**Reason:** NGOs are involved in the maintenance of these protected areas.
99. **Assertion:** Insects are enormously diversified.  
**Reason:** It is because of the presence of exoskeleton made up of chitin.
100. **Assertion:** Habitat loss and fragmentaion is the most important cause driving animals and plants to extinction.  
**Reason:** Habitat loss and fragmentaion causes alien species invasion.
101. **Assertion:** India has more than 50000 genetically different strains of rice.  
**Reason:** India has approximately 1000 varieties of mango
102. **Assertion:** According to the IUCN (2004), the total number of plant and animal species described so far is lightly more than 1.5 million.  
**Reason:** For many taxonomic groups, species inventories are more complete in temperate than in tropical areas.
103. **Assertion:** Most diversified organism on earth is insects.  
**Reason:** insects possess chitinous exoskeleton
104. **Assertion:** The diversity of microbes may run into millions.  
**Reason:** If we use biochemical or molecular criteria to estimate microbial species.
105. **Assertion:** India is one of the 12 mega biodiversity economies of the world.  
**Reason:** India has only 2.4% of the world's land area. It shares 8.1% if the global species diversity.
106. **Assertion:** Colombia located near the equator has nearly 1400 species of birds which New York 41° N has 105 species and green land at 71°N only 56 species.  
**Reason:** Generally tropics harbour more species than temperate or polar region.
107. **Assertion:** Tropics have greater biological diversity.  
**Reason:** More solar energy in tropics, contributes to lighter productivity, which in turn may contribute directly to greater biodiversity.
108. **Assertion:** Removal of key stone from an ecosystem leads to destruction of ecosystem.  
**Reason:** Keystone species drive major ecosystem functions.
109. **Assertion:** Amazon rain forest is called lung of out planet.  
**Reason:** Amazon rain forest produces 80% of total oxygen in Earth's atmosphere through process of photosynthesis.
110. **Assertion:** There are 34 biodiversity hotspots in the world  
**Reason:** High level of species richness is a criterion for selection of a biodiversity hotspot.
111. **Assertion:** Species richness is also function of the area of a region.  
**Reason:** The species area relationship is generally a rectangle hyperbolic function.

## PREVIOUS YEAR QUESTIONS

1. Which one of the following is an example of ex-situ conservation?  
[AIPMT PRE 2010]
- (a) Wildlife sanctuary (b) Seed bank  
(c) Sacred groves (d) National park
2. Biodiversity of a geographical region represents  
[AIPMT MAINS 2011]
- (a) Endangered species found in the region.  
(b) The diversity in the organism living in the region.  
(c) Genetic diversity in the dominant species of the region.  
(d) Species endemic to the region.
3. Large woody vines are more commonly found in  
[AIPMT PRE 2011]
- (a) Mangroves (b) Tropical rainforests  
(c) Alpine forests (d) Temperate-forests
4. Which one of the following shows maximum genetic diversity in India?  
[AIPMT PRE 2011]
- (a) Rice (b) Maize  
(c) Mango (d) Groundnut
5. Select the correct statement about biodiversity.  
[AIPMT MAINS 2012]
- (a) Large scale planting of Bt cotton has no adverse effect on biodiversity.  
(b) Western Ghats have a very high degree of species richness and endemism.  
(c) Conservation of biodiversity is just a fad pursued by the developed countries.  
(d) The desert areas of Rajasthan and Gujarat have a very high level of desert animal species as well as numerous rare animals.
6. Sacred groves are specially useful in  
[AIPMT MAINS 2012]
- (a) Preventing soil erosion (b) Year-round flow of water in rivers  
(c) Conserving rare and threatened species (d) Generating environmental awareness
7. Which one of the following areas in India is a hotspot of biodiversity?  
[AIPMT PRE 2012]
- (a) Eastern Ghats (b) Gangetic Plain  
(c) Sunderbans (d) Western Ghats
8. The highest number of species in the world is represented by  
[AIPMT PRE 2012]
- (a) Fungi (b) Mosses  
(c) Algae (d) Lichens
9. Which of the following is not used for ex situ plant conservation?  
[AIPMT 2013]

- (a) Field gene banks (b) Seed banks  
(c) Shifting cultivation (d) Botanical Gardens
10. Which of the following represent maximum number of species among global biodiversity?  
[AIPMT 2013]
- (a) Algae (b) Lichens  
(c) Fungi (d) Mosses and Ferns
11. An example of ex situ conservation is  
[AIPMT 2014]
- (a) National Park (b) Seed Bank  
(c) Wildlife Sanctuary (d) Sacred Grove
12. A species facing extremely high risk of extinction in the immediate future is called  
[AIPMT 2014]
- (a) Vulnerable (b) Endemic  
(c) Critically endangered (d) Extinct
13. The organization which publishes the Red list of species is  
[AIPMT 2014]
- (a) ICFRE (b) IUCN  
(c) UNEP (d) WWF
14. Given below is the representation of the extent of global diversity of invertebrates. What groups the four portions (A to D) represent respectively?  
[AIPMT 2014]



- (a) A: Insects, B: Crustaceans, C: Other animal groups, D: Molluscs  
(b) A: Crustaceans, B: Insects, C: Molluscs, D: Other animal groups  
(c) A: Molluscs, B: Other animal groups, C: Crustaceans, D: Insects  
(d) A: Insects, B: Molluscs, C: Crustaceans, D: Other animal groups
15. Vertical distribution of different species occupying different levels in a biotic community is known as
- (a) Divergence (b) Stratification  
(c) Zonation (d) Pyramid
16. In which of the following both pairs have correct combination?  
[AIPMT 2015]
- (a) In situ conservation : National park  
Ex situ conservation : Botanical Garden  
(b) In situ conservation : Cryopreservation  
Ex situ conservation : Wildlife Sanctuary

- (c) In situ conservation : Seed Bank  
Ex situ conservation : National park
- (d) In situ conservation : Tissue culture  
Ex situ conservation : Sacred groves
17. Which of the following characteristics is mainly responsible for the diversification of insects of land? [AIPMT 2015]
- (a) Segmentation (b) Bilateral symmetry  
(c) Exoskeleton (d) Eyes
18. Most animals are tree dwellers in a [AIPMT 2015]
- (a) Coniferous forest  
(b) Thorn woodland  
(c) Temperature deciduous forest  
(d) Tropical rain forest
19. Cryopreservation of gametes of threatened species in viable and fertile condition can be referred to as [AIPMT 2015]
- (a) In situ conservation of biodiversity.  
(b) Advanced ex situ conservation of biodiversity.  
(c) In situ conservation by sacred groves.  
(d) In situ cryo-conservation of biodiversity.
20. The species confined to a particular region and not found elsewhere is termed as [RE-AIPMT 2015]
- (a) Alien (b) Endemic  
(c) Rare (d) Keystone
21. Which of the National Aquatic Animal of India? [NEET - I, 2016]
- (a) Gangetic shark (b) River dolphin  
(c) Blue whale (d) Sea-horse
22. Which of the following is the most important cause of animals and plants being driven to extinction? [NEET - I, 2016]
- (a) Over-exploitation (b) Alien species invasion  
(c) Habitat loss and fragmentation (d) Co-extinctions
23. How many hot spots biodiversity in the world have been identified till date by Norman Myers? [NEET - II, 2016]
- (a) 25 (b) 34 (c) 43 (d) 17
24. Red list contains data or information on [NEET - II, 2016]
- (a) Plants whose products are in international trade  
(b) Threatened species  
(c) Marine vertebrate only  
(d) All economically important plants



25. Which of the following National Parks is home to the famous musk deer or hangul?  
[NEET - II, 2016]
- (a) Bandhavgarh National Park, Madhya Pradesh  
 (b) Eaglenest Wildlife Sanctuary, Arunachal Pradesh  
 (c) Dachigam National Park, Jammu & Kashmir  
 (d) Keibul Lamjao National Park, Manipur

### NCERT EXEMPLAR QUESTIONS

- Which of the following countries has the highest biodiversity?  
 (a) Brazil                      (b) South Africa                      (c) Russia                      (d) India
- Which of the following is not a cause for the loss of biodiversity?  
 (a) Destruction of habitat                      (b) Invasion by alien species  
 (c) Keeping animals in zoological parks                      (d) Over-exploitation of natural resources
- Which of the following is not an invasive alien species in the Indian context?  
 (a) *Lantana*                      (b) *Cynodon*                      (c) *Parthenium*                      (d) *Eichhornia*
- Where among the following will you find the pitcher plant?  
 (a) Rain forest of Northeast India                      (b) Sunderbans  
 (c) Thar Desert                      (d) Western Ghats
- Which one of the following is not a characteristic feature of biodiversity hotspots?  
 (a) Large number of species                      (b) Abundance of endemic species  
 (c) Mostly located in the Polar Regions                      (d) Mostly located in the tropics
- Match the animals given in column A with their location in column B.
 

| Column A               | Column B      |
|------------------------|---------------|
| (i) Dodo               | (A) Africa    |
| (ii) Quagga            | (B) Russia    |
| (iii) Thylacine        | (C) Mauritius |
| (iv) Steller's sea cow | (D) Australia |

 Choose the correct match from the following:  
 (a) i-A, ii-C, iii-B, iv-D                      (b) i-D, ii-C, iii-A, iv-B  
 (c) i-C, ii-A, iii-B, iv-D                      (d) i-C, ii-A, iii-D, iv-B
- What is common to the following plants: *Nepenthes*, *Psilotum*, *Rauwolfia* and *Aconitum*?  
 (a) All are ornamental plants  
 (b) All are phylogenic link species  
 (c) All are prone to over exploitation  
 (d) All are exclusively present in the Eastern Himalayas.
- The one-homed rhinoceros is specific to which of the following sanctuary  
 (a) Bhitarkanika                      (b) Bandipur                      (c) Kaziranga                      (d) Corbett park
- Amongst the animal groups given below, which one has the highest percentage of endangered species?  
 (a) Insects                      (b) Mammals                      (c) Amphibians                      (d) Reptiles

10. Which one of the following is an endangered plant species of India?  
(a) *Rauvolfia serpentina* (b) *Santalum album* (Sandal wood)  
(c) *Cycas beddomei* (d) All of the above
11. What is common to Lantana, *Eichhornia* and African catfish?  
(a) All are endangered species of India.  
(b) All are key stone species.  
(c) All are mammals found in India.  
(d) All the species are neither threatened nor indigenous species of India.
12. The extinction of passenger pigeon was due to  
(a) Increased number of predatory birds (b) Over exploitation by humans  
(c) Non-availability of the food (d) Bird flu virus infection
13. Which of the following statements is correct?  
(a) *Parthenium* is an endemic species of our country.  
(b) African catfish is not a threat to indigenous catfishes.  
(c) Steller's sea cow is an extinct animal.  
(d) *Lantana* is popularly known as carrot grass.
14. Among the ecosystem mentioned below, where can one find maximum biodiversity?  
(a) Mangroves (b) Desert (c) Coral reefs (d) Alpine meadows
15. Which of the following forests is known as the 'lungs of the planet Earth'?  
(a) Tiaga forest (b) Tundra forest  
(c) Amazon rain forest (d) Rain forests of Northeast India
16. The active chemical drug reserpine is obtained from  
(a) *Datura* (b) *Rauvolfia* (c) *Atropa* (d) *Papaver*
17. Which of the following group exhibit more species diversity?  
(a) Gymnosperms (b) Algae (c) Bryophytes (d) Fungi
18. Which of the below mentioned regions exhibit less seasonal variations?  
(a) Tropics (b) Temperate  
(c) Alpines (d) Both (a) and (b)
19. The historic convention on Biological Diversity held in Rio de Janeiro in 1992 is known as  
(a) CITES Convention (b) The Earth Summit  
(c) G-16 Summit (d) MAB Programme
20. What is common to the techniques (i) *in vitro* fertilization, (ii) Cryo preservation and (iii) tissue culture?  
(a) All are *in situ* conservation methods.  
(b) All are *ex situ* conservation methods.  
(c) All require ultra-modern equipment and large space.  
(d) All are methods of conservation of extinct organisms.

### Answer Keys

#### *Practice Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d)  | 2. (c)  | 3. (d)  | 4. (a)  | 5. (d)  | 6. (a)  | 7. (c)  | 8. (b)  | 9. (d)  | 10. (b) |
| 11. (a) | 12. (a) | 13. (c) | 14. (d) | 15. (d) | 16. (d) | 17. (b) | 18. (d) | 19. (d) | 20. (c) |
| 21. (b) | 22. (d) | 23. (a) | 24. (c) | 25. (d) | 26. (c) | 27. (a) | 28. (c) | 29. (a) | 30. (d) |
| 31. (d) | 32. (d) | 33. (c) | 34. (d) | 35. (d) | 36. (a) | 37. (a) | 38. (b) | 39. (c) | 40. (b) |
| 41. (a) | 42. (b) | 43. (c) | 44. (b) | 45. (d) | 46. (a) | 47. (b) | 48. (d) | 49. (d) | 50. (a) |
| 51. (a) | 52. (c) | 53. (d) | 54. (d) | 55. (d) | 56. (d) | 57. (d) | 58. (d) | 59. (d) | 60. (a) |
| 61. (c) | 62. (d) | 63. (d) | 64. (d) | 65. (d) | 66. (b) | 67. (a) | 68. (d) | 69. (d) | 70. (d) |
| 71. (d) | 72. (c) | 73. (d) | 74. (c) | 75. (b) | 76. (b) | 77. (b) | 78. (d) | 79. (b) | 80. (d) |
| 81. (c) | 82. (c) | 83. (b) | 84. (d) | 85. (d) | 86. (d) | 87. (d) | 88. (d) | 89. (c) | 90. (b) |

#### *Assertion and Reason Questions*

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 91. (a)  | 92. (a)  | 93. (b)  | 94. (a)  | 95. (b)  | 96. (a)  | 97. (a)  | 98. (d)  | 99. (a)  | 100. (c) |
| 101. (b) | 102. (b) | 103. (a) | 104. (a) | 105. (a) | 106. (a) | 107. (c) | 108. (a) | 109. (a) | 110. (b) |
| 111. (b) |          |          |          |          |          |          |          |          |          |

#### *Previous Year Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (b)  | 2. (b)  | 3. (d)  | 4. (a)  | 5. (b)  | 6. (a)  | 7. (c)  | 8. (a)  | 9. (c)  | 10. (c) |
| 11. (b) | 12. (c) | 13. (b) | 14. (d) | 15. (b) | 16. (a) | 17. (c) | 18. (d) | 19. (b) | 20. (b) |
| 21. (b) | 22. (c) | 23. (b) | 24. (b) | 25. (c) |         |         |         |         |         |

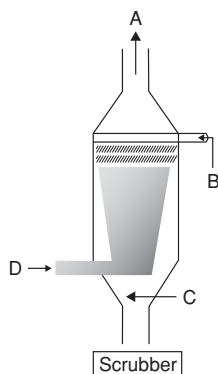
#### *NCERT Exemplar Questions*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a)  | 2. (c)  | 3. (b)  | 4. (a)  | 5. (c)  | 6. (d)  | 7. (c)  | 8. (c)  | 9. (c)  | 10. (d) |
| 11. (d) | 12. (b) | 13. (c) | 14. (c) | 15. (c) | 16. (b) | 17. (d) | 18. (a) | 19. (b) | 20. (b) |

## PRACTICE QUESTIONS

**Pollution**

- Pollution is any undesirable change in physical, chemical or biological characteristics of
  - Air
  - Land
  - Water or soil
  - All of these
- Agents which cause pollution are known as
  - Mutants
  - Carcinogens
  - Pollutants
  - Allergens
- In which year did Government of India pass the Environment (Protection) Act to protect and improve the quality of environment (air, water and soil)?
  - 1978
  - 1986
  - 1981
  - 1987
- What are the effects of air pollution on plants?
  - Growth retardation
  - Decrease in yield
  - Premature death
  - All of these
- Which system of humans and animals are affected mostly by air pollution?
  - Respiratory system
  - Digestive system
  - Circulatory system
  - Excretory system
- Harmful effects of air pollution depends on
  - Concentration of pollutants
  - Duration of exposure
  - Type of organism
  - All of these
- The most widely used and effective device for removing particulate matter is
  - Arrester
  - Scrubber
  - Electrostatic precipitator
  - Converters
- Identify A, B, C and D in the diagram.



- (a) A: Dirty air, B: Water line spray, C: Clean air, D: Particulate matter  
 (b) A: Clean air, B: Water line spray, C: Particulate matter, D: Dirty air  
 (c) A: Water line spray, B: Particulate matter, C: Clean air, D: Dirty air  
 (d) A: Particulate matter, B: Dirty air, C: Clean air, D: Water line spray
9. ESP removes approx \_\_\_\_\_% of particulate matter present in exhaust from a thermal power plant.  
 (a) 60 (b) 80 (c) 99 (d) 85
10. Which statement is incorrect about ESP (Electrostatic Precipitator)?  
 (a) Corona produces electrons.  
 (b) Collecting plates are grounded, so it is used to attract the charged dust particle.  
 (c) Velocity of air between the plates must be low.  
 (d) Electrodes wires that are maintained at hundred volts produces corona.
11. Scrubber is used to remove which of the following gas?  
 (a) SO<sub>2</sub> (b) N<sub>2</sub> (c) O<sub>2</sub> (d) CO<sub>2</sub>
12. According to CPCB which particulate size causes greatest harm to human health?  
 (a) 2.5 μm (b) 3.5 μm (c) 4.5 μm (d) 5.2 μm
13. PM 2.5 or less than that in diameter in air causes  
 (a) Irritation and inflammation in lungs (b) Damage to lungs  
 (c) Premature deaths (d) All of these
14. \_\_\_\_\_ is a major cause of air pollution in metro cities.  
 (a) Factory (b) Automobiles  
 (c) Smoking (d) Thermal power plant
15. Automobile pollution is reduced by using  
 (a) Lead-free petrol or diesel (b) Catalytic converters  
 (c) Both (a) and (b) (d) None of these
16. The metal used in catalytic converter in automobiles is  
 (a) Platinum (b) Palladium (c) Rhodium (d) Any of these
17. What is/are done by catalytic converters?  
 (a) Unburnt hydrocarbons are converted to CO<sub>2</sub> and H<sub>2</sub>O.  
 (b) CO is converted to CO<sub>2</sub>.  
 (c) Nitric oxide is changed to N<sub>2</sub>.  
 (d) All the above
18. Motor vehicle equipped with catalytic converters should use unleaded petrol because  
 (a) Lead activates the catalyst (b) Lead deactivates catalyst  
 (c) Lead increases fuel efficiency (d) Lead decreases fuel efficiency
19. Match the columns.

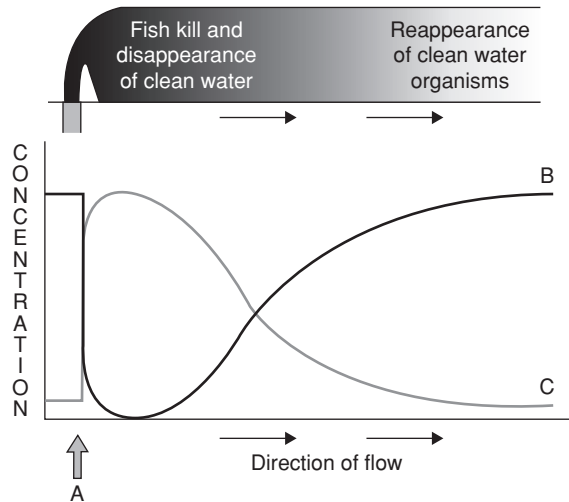
| Column-I                                           | Column-II |
|----------------------------------------------------|-----------|
| A. Air (Prevention and Control of Pollution) Act   | 1. 1987   |
| B. Water (Prevention and Control of Pollution) Act | 2. 1981   |
| C. Noise added as air pollutant                    | 3. 1974   |
| D. Environment (Protection) Act                    | 4. 1986   |

- (a) A:2, B:3, C:4, D:1  
(c) A:4, B:3, C:2, D:1
- (b) A:2, B:3, C:1, D:4  
(d) A:4, B:3, C:1, D:2
20. Noise is an undesirable high level of sound and causes all of these except  
(a) Psychological disorder  
(c) Altered breathing pattern
- (b) Increased heart beat  
(d) Sleepiness
21. A brief exposes of extremely high sound level, of \_\_\_\_\_ or more generated by takeoff of jet plane or rocket, may damage ear drums thus permanently impairing hearing ability.  
(a) 80 dB  
(b) 20 dB  
(c) 150 dB  
(d) 60 dB
22. Which of these measures can be adopted to control noise pollution?  
(a) Areas around hospitals and schools should be made horn-free zones.  
(b) Use of loudspeakers should be restricted to a fixed intensity and fixed hours of the day,  
(c) Occupational exposure to noise can be reduced by using cotton plugs.  
(d) All the above
23. In the 1990s Delhi ranked \_\_\_\_\_ among the 41 most polluted cities in the world.  
(a) 1st  
(c) 3rd
- (b) 2nd  
(d) 4th
24. CNG is a better fuel than petrol or diesel because CNG  
(a) Burns efficiently  
(b) Cannot be siphoned off and adulterated  
(c) Non-carcinogenic and non-corrosive  
(d) All of these
25. According to Euro II norms, sulphur should be controlled at \_\_\_\_\_ in diesel and \_\_\_\_\_ in petrol.  
(a) 350 ppm, 150 ppm  
(c) 50 ppm, 50 ppm
- (b) 50 ppm, 150 ppm  
(d) 350 ppm, 50 ppm
26. Four wheelers have to follow the Bharat stage IV in how many mega cities of India since April, 2010?  
(a) 11  
(b) 12  
(c) 13  
(d) 14
27. Bharat stage III is applicable to 2 and 3 wheelers throughout the country since  
(a) 2008  
(b) 2009  
(c) 2010  
(d) 2011
28. What is the minimum percentage of impurity that makes domestic sewage unfit for human use?  
(a) 0.1%  
(b) 1%  
(c) 3%  
(d) 10%
29. Match the columns for the composition of waste water which contains 0.1% impurities.

| Column-I              | Column-II                                                 |
|-----------------------|-----------------------------------------------------------|
| A. Suspended solid    | 1. Nitrate, $\text{NH}_3$ , sodium, calcium and phosphate |
| B. Colloidal material | 2. Fecal matter, bacteria, cloth and paper                |
| C. Dissolved material | 3. Sand, silt and clay                                    |

- (a) A:1, B:2, C:3  
(c) A:2, B:3, C:1
- (b) A:3, B:2, C:1  
(d) A:1, B:3, C:2

30. Identify A, B and C in the figure.



- (a) A: Dissolved oxygen, B: BOD, C: Sewage discharge  
 (b) A: Sewage discharge, B: Dissolved oxygen, C: BOD  
 (c) A: BOD, B: Sewage discharge, C: Dissolved oxygen  
 (d) A: Dissolved oxygen, B: Sewage discharge, C: BOD
31. Which of the following is the most difficult to remove from waste water?  
 (a) Suspended solids (b) Dissolved salts  
 (c) Biodegradable waste matter (d) All of these
32. Select the incorrect matching.  
 (a) BOD → Biochemical Oxygen Demand  
 (b) JFM → Joint Forest Management  
 (c) DU → Degree of Unsaturation  
 (d) FOAM → Friends of the Arcata March
33. What happens to sewage water from the point of sewage discharge?  
 (a) Dissolved oxygen ↓eses (b) Mortality of fish ↑eses  
 (c) Biological oxygen demand ↑eses (d) All of these
34. World's most problematic aquatic weed is  
 (a) Terror of Bengal (b) Water hyacinth  
 (c) *Eichhornia crassipes* (d) All of these
35. Water hyacinth is introduced in India for  
 (a) High growth rate (b) Beautiful flowers  
 (c) Disease resistance gene (d) All of these
36. The presence of large amount of nutrients in water causes excessive growth of planktonic (free-floating) algae, called. This is called  
 (a) Red tide (b) Bio-magnification  
 (c) Algal bloom (d) Biofortification

37. Which of these diseases is/are caused by contaminated water?  
(a) Dysentery (b) Typhoid, jaundice  
(c) Cholera (d) All of these
38. Heavy metal in waste water comes from  
(a) Petroleum industries (b) Paper manufacturing industries  
(c) Metal extraction industries (d) All of these
39. Which of the following are heavy metals (density > 5gm/cc)?  
(a) Hg, Cd (b) Cu  
(c) Pb (d) All of these
40. Increase in concentration of the toxic substances at successive trophic levels is known as  
(a) Biofortification (b) Biowar  
(c) Bioinformatics (d) Biomagnification
41. The phenomena of biomagnification in aquatic ecosystem is well-known for the rising presence of  
(a) Hg (b) DDT  
(c) Both (a) and (b) (d) None of these
42. If the water contains 0.003ppb of DDT then fish eating birds contain what level of DDT?  
(a) 0.04 ppm (b) 2 ppm  
(c) 0.5 ppm (d) 25 ppm
43. High concentration of DDT causes decline in  
(a) Fish population (b) 200 plankton population  
(c) Small fish population (d) Bird population
44. Which of these is/are true about DDT?  
(a) Undergo biomagnifications in aquatic ecosystem.  
(b) Disturbs calcium metabolism in bird.  
(c) Causes thinning of eggshell leads to premature breaking.  
(d) All the above
45. Natural aging of lake by nutrient enrichment of its water is  
(a) Biofortification (b) Biomagnification  
(c) Biogeochemical cycle (d) Eutrophication
46. Eutrophication occurs because of  
(a) Ca and Mg (b) Nitrogen and phosphorous  
(c) Carbon and oxygen (d) Hg and DDT
47. Natural aging of lake depends on  
(a) Climatic factors (b) Size of lake  
(c) Nutrient content of lake (d) All of these
48. Accelerated aging process of lake, because of pollutants from activities like effluents from the industries and homes, is known as  
(a) Cultural eutrophication (b) Accelerated eutrophication  
(c) Both a and b (d) Biomagnification



49. Which of the following is/are caused by algal bloom in a water body?
- (a) Scum
  - (b) Unpleasant odour
  - (c) Robbing the water of dissolved oxygen
  - (d) All of these
50. Select the correct statement from the following.
- (A) Thermal wastewater eliminates or reduces the number of organisms sensitive to high temperature.
  - (B) In a young lake the water is cold and clear supporting little life.
  - (C) DDT disturbs calcium metabolism in birds, which causes thinning of eggshell and their premature breaking, eventually causing decline in bird population.
  - (D) Terror of Bengal grows abundantly in eutrophic water bodies.
- (a) A and B only
  - (b) C and D only
  - (c) A and D only
  - (d) A, B, C and D all
51. Which of these facts are true with regard to wastewater treatment in the town of Arcata, California?
- (a) The cleaning occurs in two stages.
  - (b) In the first stage, conventional sedimentation, filtering and chlorine treatment are given.
  - (c) In the second stage biologists developed a series of six connected marshes of over 60 hectares of marshland, appropriate plant, algae, fungi and bacteria are seeded in this area, which neutralizes, absorb and assimilates the pollutants.
  - (d) All the above
52. Dry composting toilet is useful in handling human excreta because this is
- (a) Practical and hygienic
  - (b) Efficient
  - (c) Cost-effective
  - (d) All of these
53. 'EcoSan' toilets have been made effective in many areas of:
- (a) Kerala
  - (b) Sri Lanka
  - (c) Both (a) and (b)
  - (d) None of these
54. Find the incorrect statement.
- (a) Sanitary landfills were adopted as the substitute for open burning dumps.
  - (b) Seepage of chemical from landfills pollutes the underground water resources.
  - (c) All waste that we generate can be categorized into three types, i.e., bio-degradable, recyclable and non-biodegradable.
  - (d) Open dumps inhibit breeding of rats and flies.
55. Select the correct statement.
- (A) Use of incinerator is crucial to the disposal of hospital waste.
  - (B) Recycling is the only solution for the treatment of e-waste.
  - (C) Fish-eating birds containing 2ppm DDT become agents of biomagnifications.
  - (D) Polyblend, is a fine powder of bitumen.
- (a) A and B only
  - (b) B and C only
  - (c) C and D only
  - (d) A, B and C only
56. Road laid by polyblend with bitumen have all of the following properties except
- (a) More water repellent
  - (b) Increases road life by a factor of three
  - (c) Less bleeding in summer
  - (d) Increases the cost of road laying

57. Who prepared polyblend?  
(a) Ahmed Khan (b) Ramesh Chand Dagar  
(c) Amrita Devi (d) Sunderlal Bahuguna
58. Who created Haryana Kisan Welfare Club?  
(a) Ahmed Khan (b) Ramesh Chand Dagar  
(c) Amrita Devi (d) Sunderlal Bahuguna
59. Integrated organic farming is a \_\_\_\_\_ and \_\_\_\_\_ procedure.  
(a) non-cyclical, zero waste (b) cyclical, zero waste  
(c) non-cyclical, wasteful (d) cyclical, wasteful
60. Accidental leakage in nuclear plants occurred in  
(a) Three mile island (b) Chernobyl  
(c) Bhopal (d) Both (a) and (b)
61. The problem with the use of nuclear energy is  
(a) Accidental leakage (b) Safe disposal of radioactive waste  
(c) Both (a) and (b) (d) None of these
62. Which of these is/are true with regard to nuclear radiation coming from nuclear waste?  
(a) It causes mutation at very high rate (b) High dose of radiation is lethal  
(c) Low doses causes diseases like cancer (d) All of these
63. How deep should nuclear waste after sufficient pre-treatment be buried (in shielded containers) within the rocks below the earth's surface?  
(a) 100 m (b) 200 m (c) 300 m (d) 500 m

### **Green House Effect and Global Warming**

64. Without greenhouse effect the average temperature at surface of Earth would have been \_\_\_\_\_.  
(a)  $-0^{\circ}\text{C}$  (b)  $15^{\circ}\text{C}$  (c)  $-18^{\circ}\text{C}$  (d)  $6^{\circ}\text{C}$
65. Earth's present average temperature is  
(a)  $0^{\circ}\text{C}$  (b)  $15^{\circ}\text{C}$  (c)  $-18^{\circ}\text{C}$  (d)  $6^{\circ}\text{C}$
66. What part of the incoming solar radiation actually comes through and falls on Earth's surface heating it?  
(a)  $1/4$  (b)  $1/2$  (c)  $1/3$  (d)  $2/3$
67. Which gas contributes the maximum to the greenhouse effect?  
(a)  $\text{CH}_4$  (b)  $\text{CO}_2$  (c) CFCs (d)  $\text{N}_2\text{O}$
68. What is the contribution of methane gas to the total global warming?  
(a) 60% (b) 20% (c) 14% (d) 6%
69. During the past century, the temperature of earth has increased by \_\_\_\_\_.  
(a)  $0.6^{\circ}\text{C}$  (b)  $5^{\circ}\text{C}$  (c)  $6^{\circ}\text{C}$  (d)  $1^{\circ}\text{C}$
70. Greenhouse gases absorb \_\_\_\_\_ radiation from the earth and emits it again towards the earth. The cycle continues till the earth's surface has no \_\_\_\_\_ radiation to emit.  
(a) long wave (infrared), long wave (b) short wave (uv), long wave  
(c) long wave (infrared), short wave (uv) (d) short wave (uv), short wave (uv)

71. Rise in temperature is leading to deleterious changes in the environment and resulting is odd climatic change such as  
(a) Ozone depletion (b) Greenhouse effect  
(c) Water logging (d) El Nino effect
72. We can control global warming by the following means except  
(a) Cut down use of fossil fuel (b) Slow down growth of human population  
(c) Improving efficiency of energy uses (d) Deforestation
73. The thickness of ozone is measured in terms of  
(a) BOD (b) D.O.  
(c) DU (d) ROP
74. Bad ozone is formed in  
(a) Stratosphere (b) Ionosphere  
(c) Troposphere (d) Lithosphere
75. Which of the following biomolecule absorbs UV radiation?  
(a) DNA (b) Protein  
(c) Both (a) and (b) (d) Carbohydrates
76. Good ozone is found in  
(a) Stratosphere (b) Ionosphere  
(c) Troposphere (d) Lithosphere
77. Ozone degradation is done by  
(a) DDT (b) CFCs  
(c) CH<sub>4</sub> (d) CO<sub>2</sub>
78. In stratosphere, UV rays act on CFCs (Chlorofluoro Carbons) and release which atom leading to ozone depletion?  
(a) 'F' atoms (b) 'Cl' atoms  
(c) 'H' atoms (d) 'C' atoms
79. Which of these is incorrect about ozone depletion?  
(a) CFCs releases 'Cl' atom causes degradation of O<sub>3</sub>.  
(b) 'Cl' atoms acts as catalyst.  
(c) 'Cl' atom is not consumed in the reaction.  
(d) It is minimum over Antarctica region
80. Antarctic region has a large area of thinned ozone layer, commonly known as  
(a) Dobson unit (b) Ozone hole  
(c) Black hole (d) All of these
81. UV-B radiation causes  
(a) Damage to DNA (b) Aging of skin  
(c) Skin cancer (d) All of these
82. In human eye, cornea absorbs UV- B radiation and a high dose of UV-B causes inflammation of cornea, known as  
(a) Night blindness (b) Xerophthalmia  
(c) Epicanthus (d) Snow-blindness

83. Which international treaty was signed at Montreal (Canada) in 1987 (effective in 1989) to control the emission of ozone depleting substances?  
(a) Kyoto Protocol (b) Earth Summit  
(c) Montreal Protocol (d) All of these
84. Ozone hole over Antarctica develops each year between  
(a) Late August and early October (b) Late February and early April  
(c) Late December and early February (d) Late October and early December
85. In which year did Government of India introduce the concept of Joint Forest Management (JFM)?  
(a) 1974 (b) 1980 (c) 1990 (d) 1970
86. 'Chipko movement' was started by which community?  
(a) Bishnois (b) Garhwal (c) Sahiwal (d) Jain
87. How many daughters of Amrita Devi were cut down along with trees?  
(a) 1 (b) 2 (c) 3 (d) 4
88. Government of India has recently instituted which award for individuals or communities from rural areas that have shown extra-ordinary courage and dedication in protecting wildlife?  
(a) Padma Bhushan  
(b) Chipko Award  
(c) Bharat Ratna  
(d) Amrita Devi Bishnoi Wildlife Protection Award
89. According to an estimate, almost \_\_\_\_\_ per cent forests have been lost in the tropics, compared to only \_\_\_\_\_ per cent in the temperate region.  
(a) 40, 10 (b) 60, 20 (c) 40, 1 (d) 20, 1
90. National Forest Policy (1988) of India has recommended \_\_\_\_\_ per cent forest cover for the plains and \_\_\_\_\_ per cent for the hills.  
(a) 60, 40 (b) 33, 67 (c) 40, 60 (d) 67, 33
91. By the end of 20th century India lost how much forest cover?  
(a) 30% (b) 19.4% (c) 33% (d) 10.6
92. Jhum cultivation (slash and burn agriculture) is found in which part of India?  
(a) North-eastern state (b) Western state  
(c) Southern state (d) Desert state
93. Which of these statements is/are true about slash and burn agriculture?  
(a) Farmers cut down trees of the forest and burn the plant remains.  
(b) Ash is used as fertilizer.  
(c) Land is used for farming or cattle grazing.  
(d) All the above
94. Deforestation causes all of these except  
(a) Soil erosion and loss of biodiversity  
(b) Desertification  
(c) Increase CO<sub>2</sub> concentration in atmosphere  
(d) Undisturbed hydrological cycle

95. Which of these statements is/are true about reforestation?  
 (a) It is a process of restoring forest (b) It may occur naturally  
 (c) It can be sped up by planting trees (d) All of these
96. Soil erosion occurs because of  
 (a) Over-cultivation  
 (b) Unrestricted grazing  
 (c) Deforestation and poor irrigation practice  
 (d) All of these
97. Problems which came with Green Revolution are  
 (a) Water logging (b) Increased soil salinity  
 (c) Both (a) and (b) (d) None of these
98. Irrigation without proper drainage leads to  
 (a) Decreased soil salinity (b) Water logging  
 (c) Increased yield of crop (d) Increased aeration in soil
99. Desertification is a major problem nowadays, mainly due to  
 (a) Over grazing (b) Over-cultivation  
 (c) Increased urbanization (d) Water logging

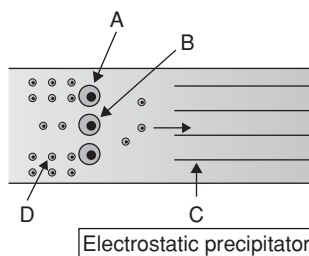
100. Match the columns.

| Column-I | Column-II                     |
|----------|-------------------------------|
| A. DU    | 1. Dobson Unit                |
| B. CFCs  | 2. Chloro Fluoro Carbons      |
| C. BOD   | 3. Biological Oxygen Demand   |
| D. PIL   | 4. Public Interest Litigation |
| E. CNG   | 5. Compressed Natural Gas     |

- (a) A:1, B:3, C:2, D:4, E:5 (b) A:4, B:3, C:2, D:1, E:5  
 (c) A:1, B:2, C:3, D:4, E:5 (d) A:1, B:2, C:4, D:3, E:5

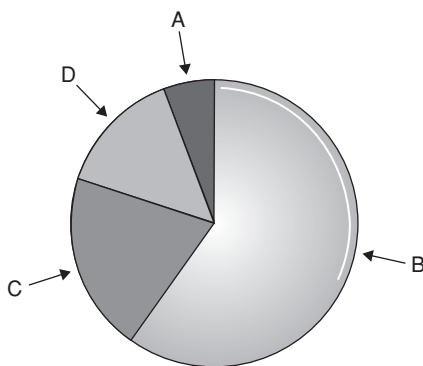
101. Select the incorrect match.  
 (a) El Nino effect—odd climatic changes  
 (b) Radioactive leakage—Three Mile Island  
 (c) Biomagnification—Hg and DDT  
 (d) Haryana Kisan Welfare Club—Ahmed Khan
102. Which among these is the most common source of pollution of water bodies?  
 (a) Waste from thermal power plant  
 (b) Effluents from chemical factories  
 (c) Hospital waste  
 (d) Domestic sewage
103. Air pollution primarily results from  
 (a) Deforestation (b) Forestation  
 (c) Burning of fossil fuel (d) Eutrophication

104. Identify A, B, C and D in this figure.



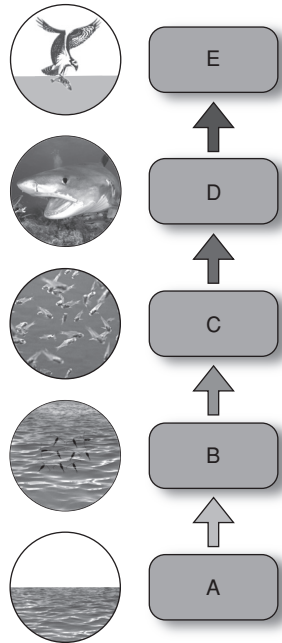
- (a) A: Discharge corona, B: Negatively charged wire, C: Collection plate grounded, D: Dust particles  
 (b) A: Dust particles, B: Discharge corona, C: Negatively charged wire, D: Collection plate grounded  
 (c) A: Negatively charged wire, B: Discharge corona, C: Collection plate grounded, D: Dust particles  
 (d) A: Collection plate grounded, B: Dust particles, C: Negatively charge wire, D: Discharge corona

105. What is the relative contribution (A, B, C, D) of various greenhouse gases according to the given pi-chart?



- (a) A:  $\text{N}_2\text{O}$  (6%), B: Carbon dioxide (60%), Methane (25%), D: CFCs (14%)  
 (b) A: Methane (25%), B: CFCs (14%), C:  $\text{N}_2\text{O}$  (6%), D: Carbon dioxide (60%)  
 (c) A: Carbon dioxide (6%), B:  $\text{N}_2\text{O}$  (6%), C: Methane (25%), D: CFCs (14%)  
 (d) A: CFCs (14%), B: Carbon dioxide (60%), C: Methane (25%), D:  $\text{N}_2\text{O}$  (6%)

106. What is the concentration of DDT in stages A, B, C, D and E in the figure?



The above diagram shows the biomagnification of DDT:

- (a) A: Water (DDT 0.003 ppm), B: Fish-eating birds (DDT 25 ppm), C: Small fish (DDT 0.5 ppm), D: Large fish (DDT 2 ppm), E: Zooplankton (DDT 0.04 ppm)
- (b) A: Fish-eating birds (DDT 25 ppm), B: Large fish (DDT 2 ppm), C: Small fish (DDT 0.5 ppm), D: Zooplankton (DDT 0.04 ppm), E: Water (DDT 0.003 ppb)
- (c) A: Water (DDT 0.003 ppb), B: Zooplankton (DDT 0.04 ppm), C: Small fish (DDT 0.5 ppm), D: Large fish (DDT 2 ppm), E: Fish-eating birds (DDT 25 ppm)
- (d) A: Small fish (DDT 0.5 ppm), B: Large fish (DDT 2 ppm), C: Zooplankton (DDT 0.04 ppm), D: Water (DDT 0.003 ppm), E: Fish-eating birds (DDT 25 ppm)

### ASSERTION AND REASON QUESTIONS

Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

- 107. Assertion:** Noise is nothing but undesirable high level of sound.  
**Reason:** Noise causes psychological and physiological disorder in humans.
- 108. Assertion:** CNG is better fuel than diesel.  
**Reason:** CNG burns most efficiently and is cheaper than petrol.
- 109. Assertion:** Presence of large amounts of nutrients in waters also causes excessive growth of planktonic (free-floating) algae, called algal bloom.  
**Reason:** Algal bloom imparts a distinct colour to the water bodies.
- 110. Assertion:** Water hyacinth is an aquatic weed.  
**Reason:** They grow abundantly in eutrophic water bodies.
- 111. Assertion:** DDT and Hg undergoes biological magnification.  
**Reason:** Hg and DDT are not metabolized and excreted by the body of organisms.
- 112. Assertion:** Sanitary landfills is also not a good method for disposal of solid wastes.  
**Reason:** These landfills causes pollution of underground water resources due to seepage of chemicals.
- 113. Assertion:** Nuclear energy is a non-polluting way for generating electricity.  
**Reason:** Nuclear waste is not at all dangerous for organism.
- 114. Assertion:** UV rays are highly injurious to living organism.  
**Reason:** DNA proteins of living organism preferentially absorb UV rays and its high energy breaks the chemical bonds within these molecules.
- 115. Assertion:** Large area of thinned ozone layer particularly marked over the Antarctic region is known as ozone hole.  
**Reason:** CFCs causes ozone depletion.
- 116. Assertion:** Deforestation may cause desertification.  
**Reason:** It causes, loss of biodiversity, disturbs hydrological cycle, causes soil erosion, may lead to desertification in extreme cases.
- 117. Assertion:** Water logging and soil salinity are some of the problems arises in the wake of green revolution.  
**Reason:** Increased urbanisation is also responsible for desertification.
- 118. Assertion:** UV-Radiation can cause skin cancer.  
**Reason:** UV-B can cause mutation in skin cell.
- 119. Assertion:** Ozone in stratosphere is called good ozone.  
**Reason:** This ozone absorb UV-radiation coming from sun, thus act as shield.
- 120. Assertion:** Integrated organic farming is cyclical zero waste procedure.  
**Reason:** In integrated organic farming waste product from one process is cycled as nutrients for other process.
- 121. Assertion:** Irreparable computers and other electronic goods are known as electronic wasters (e-wastes)  
**Reason:** Recycling is the only solution for treatment of e-waste.
- 122. Assertion:** Dry composting toilets reduce the need for chemical fertilizers.  
**Reason:** By composting method human excreta can be reduced into natural fertilizers.



- 123. Assertion:** Sewage agriculture and industrial waste accelerate the process of eutrophication.  
**Reason:** Thus waste contains nitrates and phosphates, which acts as plant nutrient.
- 124. Assertion:** Use of DDT as insecticide cause decline in bird population.  
**Reason:** DDT disturb calcium metabolism in birds, which cause thinning of eggshell and their premature breaking.
- 125. Assertion:** Catalytic converter is useful for reducing emission of poisonous gases from automobiles.  
**Reason:** Catalytic converter converts unburnt HCs in  $\text{CO}_2$  and water and CO and NO into  $\text{CO}_2$  and  $\text{N}_2$ .

### PREVIOUS YEAR QUESTIONS

1. A renewable exhaustible natural resource is [AIPMT PRE 2010]  
 (a) Coal (b) Petroleum  
 (c) Minerals (d) Forest
2. dB is a standard abbreviation used for the quantitative expression of [AIPMT PRE 2010]  
 (a) The density of bacteria in a medium (b) A particular pollutant  
 (c) The dominant bacillus in a culture (d) A certain pesticide
3. The two gases making highest relative contribution to the greenhouse gases are [AIPMT PRE 2010]  
 (a)  $\text{CO}_2$  and  $\text{CH}_4$  (b)  $\text{CH}_4$  and  $\text{NO}_2$   
 (c) CFCs and  $\text{N}_2\text{O}$  (d)  $\text{CO}_2$  and  $\text{N}_2\text{O}$
4. 'Good ozone' is found in the [AIPMT MAINS 2011]  
 (a) Mesosphere (b) Troposphere  
 (c) Stratosphere (d) Ionosphere
5. Which one of the following pairs of gases are the major cause of 'Green house effect'? [AIPMT PRE 2011]  
 (a)  $\text{CO}_2$  and CO (b) CFCs and  $\text{SO}_2$   
 (c)  $\text{CO}_2$  and  $\text{N}_2\text{O}$  (d)  $\text{CO}_2$  and  $\text{O}_3$
6. Which one of the following expanded forms of the following acronyms is correct? [AIPMT PRE 2011]  
 (a) UNEP United Nations Environmental Policy  
 (b) EPA Environmental Pollution Agency  
 (c) IUCN International Union for Conservation of Nature and Natural Resources  
 (d) IPCC International Penal for Climate Change

7. Which one of the following statements is wrong in case of Bhopal gas tragedy?  
[AIPMT PRE 2011]
- (a) Thousands of human beings died.
  - (b) Radioactive fallout engulfed Bhopal.
  - (c) It took place in the night of December 2/3, 1984.
  - (d) Methyl isocyanate gas leakage took place.
8. Eutrophication is often seen in  
[AIPMT PRE 2011]
- (a) Fresh water lakes
  - (b) Ocean
  - (c) Mountains
  - (d) Deserts
9. In an area where DDT had been used extensively the population of birds declined significantly because  
[AIPMT PRE 2012]
- (a) Birds stopped laying eggs.
  - (b) Earthworms in the area got eradicated.
  - (c) Cobras were feeding exclusively on birds.
  - (d) Many of the birds eggs laid, did not hatch.
10. Which one of the following is a wrong statement?  
[AIPMT PRE 2012]
- (a) Most of the forests have been lost in tropical areas.
  - (b) Ozone in upper part of atmosphere is harmful to animals.
  - (c) Greenhouse effect is a natural phenomenon
  - (d) Eutrophication is a natural phenomenon in freshwater bodies.
11. Measuring Biochemical Oxygen Demand (BOD) is a method used for  
[AIPMT PRE 2012]
- (a) Estimating the amount of organic matter in sewage water.
  - (b) Working out the efficiency of oil driven automobile engines.
  - (c) Measuring the activity of *saccharomyces cerevisiae* in producing curd on a commercial scale.
  - (d) Working out the efficiency of RBCs about their capacity to carry oxygen.
12. Kyoto Protocol was endorsed at  
[AIPMT 2013]
- (a) CoP-3
  - (b) CoP-5
  - (c) CoP-6
  - (d) CoP-4
13. Global warming can be controlled by  
[AIPMT 2013]
- (a) Reducing deforestation, cutting down the use of fossil fuel.
  - (b) Reducing reforestation, increasing the use of fossil fuel.
  - (c) Increasing deforestation, slowing down the growth of human population.
  - (d) Increasing deforestation, reducing the efficiency of energy usage.
14. The Air Prevention and Control of Pollution Act came into force in  
[AIPMT 2013]
- (a) 1975
  - (b) 1981
  - (c) 1985
  - (d) 1990

15. The zone of atmosphere in which the ozone layer is present is called [AIPMT 2014]  
(a) Ionosphere (b) Mesosphere  
(c) Stratosphere (d) Troposphere
16. A scrubber in the exhaust of a chemical industrial plant removes [AIPMT 2014]  
(a) Gases like sulphur dioxide.  
(b) Particulate matter of the size 5 micrometre or above.  
(c) Gases like ozone and methane.  
(d) Particulate matter of the size 2.5 micrometre or less.
17. Rachel Carson's famous book '*Silent Spring*' is related to [AIPMT 2015]  
(a) Pesticide pollution (b) Noise Pollution  
(c) Population explosion (d) Ecosystem management
18. Which of the following is not one of the primary health risks associated with greater UV radiation through the atmosphere due to depletion of stratospheric ozone? [AIPMT 2015]  
(a) Increased skin cancer  
(b) Reduced immune system  
(c) Damage to eyes  
(d) Increased liver cancer
19. The UN conference of Parties on climate change in the year 2011 was held at [AIPMT 2015]  
(a) Poland (b) South Africa  
(c) Peru (d) Qatar
20. The UN conference of Parties on climate change in the year 2012 was held at [RE-AIPMT 2015]  
(a) Doha (b) Lima  
(c) Warsaw (d) Durban
21. Acid rain is caused by the increase in the atmospheric concentration of [RE-AIPMT 2015]  
(a)  $\text{SO}_3$  and CO (b)  $\text{CO}_2$  and CO  
(c)  $\text{O}_3$  and dust (d)  $\text{SO}_2$  and  $\text{NO}_2$
22. Increase in the concentration of the toxicant at successive trophic levels is known as [RE-AIPMT 2015]  
(a) Biodeterioration (b) Biotransformation  
(c) Biogeochemical cycling (d) Biomagnification
23. Which of the following are the most suitable indicators of  $\text{SO}_2$  pollution in the environment? [RE-AIPMT 2015]  
(a) Conifers (b) Algae  
(c) Fungi (d) Lichens

24. Eutrophication of water bodies leading to killing of fishes is mainly due to non-availability of: [RE-AIPMT 2015]  
(a) Light (b) Essential minerals  
(c) Oxygen (d) Food
25. Joint Forest Management Concept was introduced in India during: [NEET - I, 2016]  
(a) 1960s (b) 1970s  
(c) 1980s (d) 1990s
26. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers: [NEET - I, 2016]  
(a) Nitrous oxide (b) Ozone  
(c) Ammonia (d) Methane
27. A river with an inflow of domestic sewage rich in organic waste may result in: [NEET - I, 2016]  
(a) Drying of the river very soon due to algal bloom  
(b) Increased population of aquatic food web organisms  
(c) An increased production of fish due to biodegradable nutrients  
(d) Death of fish due to lack of oxygen
28. Biochemical Oxygen Demand (BOD) may not be a good index for pollution for water bodies receiving effluents from [NEET - II, 2016]  
(a) Dairy industry (b) Petroleum industry  
(c) Sugar industry (d) Domestic sewage
29. A lake which is rich in organic waste may result in [NEET - II, 2016]  
(a) Drying of the lake due to algal bloom  
(b) Increased population of fish due to lots of nutrients  
(c) Mortality of fish due to lack of oxygen  
(d) Increases population of aquatic organisms due to minerals
30. The highest DDT concentration in aquatic food chain shall occur in [NEET - II, 2016]  
(a) Seagull (b) Crab  
(c) Cell (d) Phytoplankton

---

**NCERT EXEMPLAR QUESTIONS**

---

1. Non-biodegradable pollutants are created by  
(a) Nature (b) Excessive use of resources  
(c) Humans (d) Natural disasters
2. According to the Central Pollution Control Board, particles that are responsible for causing great harm to human health are of diameter  
(a) 2.50 micrometre (b) 5.00 micrometre  
(c) 10.00 micrometre (d) 7.5 micrometre
3. The material generally used for sound proofing of rooms like a recording studio and auditorium, etc., is  
(a) Cotton (b) Coir (c) Wood (d) Styrofoam

4. Compressed Natural Gas (CNG) is  
(a) Propane (b) Methane (c) Ethane (d) Butane
5. The world's most problematic aquatic weed is  
(a) *Azalia* (b) *Wolffia* (c) *Eichhornia* (d) *Trapa*
6. Which of the following causes biomagnification?  
(a) SO<sub>2</sub> (b) Mercury (c) DDT (d) Both (b) and (c)
7. The expanded form of DDT is  
(a) Dichloro diphenyl trichloroethane (b) Dichloro diethyl trichloroethane  
(c) Dichlorodiphenyltrichloroethane (d) Dichloro diphenyl tetrachloroacetate
8. Which of the following material takes the longest time for biodegradation?  
(a) Cotton (b) Paper (c) Bone (d) Jute
9. Choose the incorrect statement.  
(a) The Montreal protocol is associated with the control of emission of ozone depleting substances.  
(b) Methane and carbon dioxide are greenhouse gases.  
(c) Dobson units are used to measure oxygen content.  
(d) Use of incinerators is crucial to the disposal of hospital wastes.
10. Among the following which one causes more indoor chemical pollution?  
(a) Burning coal (b) Burning cooking gas  
(c) Burning mosquito coil (d) Room spray
11. The green scum seen in the fresh water bodies is  
(a) Blue green algae (b) Red algae  
(c) Green algae (d) Both (a) and (c)
12. The loudness of a sound that a person can withstand without discomfort is about  
(a) 150 dB (b) 215 dB (c) 30 dB (d) 80 dB
13. The major source of noise pollution, worldwide is due to  
(a) Office equipment (b) Transport system  
(c) Sugar, textile and paper industries (d) Oil refineries and thermal power plants
14. Match correctly the following and choose the correct option:  
i. Environment Protection Act A. 1974  
ii. Air Prevention and Control of Pollution Act B. 1987  
iii. Water Act C. 1986  
iv. Amendment of Air Act to include noise D. 1981  
The correct matches is  
(a) i-C, ii-D, iii-A, iv-B (b) i-A, ii-C, iii-B, iv-D  
(c) i-D, ii-A, iii-B, iv-C (d) i-C, ii-D, iii-B, iv-A
15. Catalytic converters are fitted into automobiles to reduce the emission of harmful gases. Catalytic converters change unburnt hydrocarbons into  
(a) Carbon dioxide and water (b) Carbon monoxide  
(c) Methane (d) Carbon dioxide and methane.

16. Why is it necessary to remove sulphur from petroleum products?  
 (a) To reduce the emission of sulphur dioxide in exhaust fumes.  
 (b) To increase the efficiency of automobiles engines.  
 (c) To use sulphur removed from petroleum for commercial purposes.  
 (d) To increase the life span of engine silencers.
17. Which one of the following impurities is the easiest to remove from wastewater?  
 (a) Bacteria (b) Colloids  
 (c) Dissolved solids (d) Suspended solids
18. Which one of the following diseases is not due to contamination of water?  
 (a) Hepatitis-B (b) Jaundice (c) Cholera (d) Typhoid
19. Nuisance growth of aquatic plants and bloom-forming algae in natural waters is generally due to the high concentrations of  
 (a) Carbon (b) Sulphur (c) Calcium (d) Phosphorus
20. Algal blooms impart a distinct colour to water due to  
 (a) Their pigments  
 (b) Excretion of coloured substances  
 (c) Formation of coloured chemicals in water facilitated by physiological degradation of algae.  
 (d) Absorption of light by algal cell wall.
21. Match the items in column-I and column-II and choose the correct option:  

|                                 |                     |
|---------------------------------|---------------------|
| <b>Column-I</b>                 | <b>Column-II</b>    |
| A. UV                           | i. Biomagnification |
| B. Biodegradable organic matter | ii. Eutrophication  |
| C. DDT                          | iii. Snow blindness |
| D. Phosphates                   | iv. BOD             |

 The correct match is:  
 (a) A-ii, B-i, C-iv, D-iii (b) A-iii, B-ii, C-iv, D-i  
 (c) A-iii, B-iv, C-i, D-ii (d) A-iii, B-i, C-iv, D-i
22. In the textbook you came across the 'Three Mile Island' and 'Chernobyl' disasters associated with the accidental leakage of radioactive wastes. In India we had Bhopal gas tragedy. It is associated with which of the following?  
 (a) CO<sub>2</sub> (b) Methyl isocyanate (c) CFC's (d) Methyl cyanate

### Answer Keys

#### Practice Questions

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d)  | 2. (c)  | 3. (b)  | 4. (d)  | 5. (a)  | 6. (d)  | 7. (c)  | 8. (b)  | 9. (c)  | 10. (d) |
| 11. (a) | 12. (a) | 13. (d) | 14. (b) | 15. (c) | 16. (d) | 17. (d) | 18. (b) | 19. (b) | 20. (d) |
| 21. (c) | 22. (d) | 23. (d) | 24. (d) | 25. (a) | 26. (c) | 27. (c) | 28. (a) | 29. (b) | 30. (b) |
| 31. (b) | 32. (c) | 33. (d) | 34. (d) | 35. (b) | 36. (c) | 37. (d) | 38. (d) | 39. (d) | 40. (d) |
| 41. (c) | 42. (d) | 43. (d) | 44. (d) | 45. (d) | 46. (b) | 47. (d) | 48. (c) | 49. (d) | 50. (d) |
| 51. (d) | 52. (d) | 53. (c) | 54. (d) | 55. (a) | 56. (d) | 57. (a) | 58. (a) | 59. (b) | 60. (d) |
| 61. (c) | 62. (d) | 63. (d) | 64. (c) | 65. (b) | 66. (b) | 67. (b) | 68. (b) | 69. (a) | 70. (a) |

71. (d) 72. (d) 73. (c) 74. (c) 75. (c) 76. (a) 77. (b) 78. (b) 79. (d) 80. (b)  
81. (d) 82. (d) 83. (c) 84. (a) 85. (b) 86. (b) 87. (c) 88. (d) 89. (c) 90. (b)  
91. (d) 92. (a) 93. (d) 94. (d) 95. (d) 96. (d) 97. (c) 98. (b) 99. (c) 100. (c)  
101. (d) 102. (d) 103. (c) 104. (a) 105. (a) 106. (c)

*Assertion and Reason Questions*

107. (b) 108. (a) 109. (b) 110. (a) 111. (a) 112. (a) 113. (d) 114. (a) 115. (b) 116. (a)  
117. (b) 118. (a) 119. (a) 120. (a) 121. (b) 122. (a) 123. (a) 124. (a) 125. (a)

*Previous Year Questions*

1. (d) 2. (b) 3. (a) 4. (c) 5. (c) 6. (c) 7. (b) 8. (a) 9. (d) 10. (b)  
11. (a) 12. (a) 13. (a) 14. (b) 15. (c) 16. (a) 17. (a) 18. (d) 19. (b) 20. (a)  
21. (d) 22. (d) 23. (d) 24. (c) 25. (c) 26. (b) 27. (d) 28. (b) 29. (c) 30. (a)

*NCERT Exemplar Questions*

1. (c) 2. (a) 3. (d) 4. (b) 5. (c) 6. (d) 7. (a) 8. (c) 9. (c) 10. (a)  
11. (d) 12. (d) 13. (b) 14. (a) 15. (a) 16. (a) 17. (d) 18. (a) 19. (d) 20. (a)  
21. (c) 22. (b)

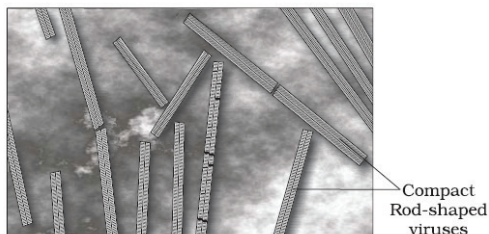
# Mock Test-I

- How many pair of gill slits are present in class from which Hagfish belongs  
(a) 3–15 (b) 4–15 (c) 5–15 (d) 6–15
- How much % of angiosperm pollen grains sheds at 2-celled stage?  
(a) >40 (b) >50 (c) >60 (d) >70
- During a period of 1960 to 2000, wheat production increased from 11 million tonnes to 75 million tonnes, while rice production went up from 35 million tones to \_\_\_\_\_ million tones.  
(a) 79.5 (b) 89.5 (c) 99.5 (d) 69.5
- What is the typical size of bacteria?  
(a) 1–2  $\mu\text{m}$  (b) 2–3  $\mu\text{m}$  (c) 3–4  $\mu\text{m}$  (d) 0.1–1.0  $\mu\text{m}$
- How many metameric segments present in earthworm?  
(a) 100–200 (b) 100–150 (c) 120–150 (d) 100–120
- If 4 individuals in a laboratory population of 40 fruit flies died during specified time interval, say a week, the death rate in the population during that period is \_\_\_\_\_ individuals per fruit fly per weeks  
(a) 0.01 (b) 0.10 (c) 1.0 (d) 10.0
- Plant capture only \_\_\_\_\_ percent of the PAR  
(a) 10–15 (b) 2–10 (c) 2–20 (d) >20
- How many restriction sites are present in *E. Coli.* cloning vector pBR322?  
(a) 6 (b) 7 (c) 8 (d) 9
- Yeast poison themselves to death when the concentration of alcohol reaches about \_\_\_\_\_ percent during fermentation.  
(a) 10 (b) 13 (c) 25 (d) 20
- Xylem formed by how many different kinds of elements?  
(a) 1 (b) 3 (c) 4 (d) 5
- A mere \_\_\_\_\_ per cent impurities make domestic sewage unfit for human use.  
(a) 0.001 (b) 0.1 (c) 1.0 (d) 10.0
- Any mineral ion concentration in the tissue that reduces the dry weight of tissue by about \_\_\_\_\_ per cent is considered to be toxic.  
(a) 20 (b) 10 (c) 5 (d) 30
- In malaria, the rupture of RBCs is associated with release of a toxic substance, haemozoin, which is responsible for the chill and high fever recurring every \_\_\_\_\_ days.  
(a) 1–2 (b) 4–5 (c) 3–4 (d) 5–6



14. It has been calculated that a 250 kg of cow produces 200 gm of proteins per day. In the same period, 250 gm of a micro-organism like *Methylophilus methylotropus*, because of its high rate of biomass production and growth, can be expected to produce \_\_\_\_\_ tonnes of protein.  
(a) 10 (b) 20 (c) 25 (d) 35
15. Of the total incident solar radiation, the proportion of PAR is  
(a) About 70% (b) About 60%  
(c) Less than 50% (d) More than 80%
16. Nearly all of the essential nutrients and \_\_\_\_\_ percent of electrolytes and water are absorbed by PCT.  
(a) 30–40 (b) 99 (c) 70–80 (d) 25
17. Robert made more conservative and scientifically estimate the global species diversity at about \_\_\_\_\_ million.  
(a) 4 (b) 1.5 (c) 20–50 (d) 7
18. National Forest Policy (1988) of India has recommended \_\_\_\_\_ per cent forest cover for the plains and \_\_\_\_\_ per cent for the hills.  
(a) 33, 67 (b) 67, 33 (c) 40, 60 (d) 60, 40
19. ABO blood group is controlled by the gene I.  
The gene I has how many types of alleles?  
(a) 1 (b) 2 (c) 3 (d) 4
20. The recent record of \_\_\_\_\_ years old viable seed is of the date palm, *Phoenix dactylifera* discovered during archaeological excavation at King Herod's palace near the dead sea.  
(a) 1000 (b) 2000 (c) 3000 (d) 500
21. In the human beings, the membrane of the erythrocyte has approximately \_\_\_\_\_ percent protein.  
(a) 42 (b) 52 (c) 62 (d) 40
22. Nitrogenase requires how many molecules of ATP for each molecule of  $\text{NH}_3$  produced?  
(a) 8 (b) 4 (c) 16 (d) 2
23. Penicillin was extensively used to treat American soldiers wounded in World War II. Fleming, Chain and Florey were awarded the Nobel Prize in which year?  
(a) 1945 (b) 1935  
(c) 1955 (d) 1940
24. There are lymphoid tissues located within the lining of the major tract (respiratory, digestive and urogenital tracts) called mucosal associated lymphoid tissue (MALT). It constitutes how much percent of lymphoid tissue in human body?  
(a) 30 (b) 40  
(c) 50 (d) 60
25. A typical angiosperm embryo sac, at maturity, though \_\_\_\_\_ nucleated is \_\_\_\_\_ celled  
(a) 8, 7 (b) 7, 8  
(c) 6, 8 (d) 8, 8
26. Blood normally contain how many (in lacs) platelets per mm<sup>3</sup>?  
(a) 1–1.5 (b) 1.5–3.5  
(c) 2.0–2.5 (d) 2.0
27. Amount of residual volume (RV) in ml is  
(a) 1100–1200 (b) 1000–1100  
(c) 2500–3000 (d) 500

28. In given diagram, rod shaped Tobacco Mosaic Virus (TMV) magnified about



- (a) 1000X (b) 1500X  
(c) 50,000X (d) 1,00,000–1,50,000X
29. Which of the following is the number of chromosomes present in gamete of rat?  
(a) 12 (b) 21 (c) 19 (d) 24
30. How many parathyroid glands are present in humans?  
(a) 1 (b) 2 (c) 3 (d) 4
31. Some interesting aspects of about earth's biodiversity are based on the currently available species inventories. More than \_\_\_\_\_ percent of all the species recorded are animals.  
(a) 50 (b) 60 (c) 70 (d) 90
32. How many stamens are present in a flower of Indigofera?  
(a) 5 (b) 10 (c) 9 (d) 4
33. Mitochondria is sausage shaped or cylindrical having a diameter of \_\_\_\_\_.  
(a) 0.2–1.0  $\mu\text{m}$  (b) 1.0–2.0  $\mu\text{m}$   
(c) 0.01–0.1  $\mu\text{m}$  (d) 0.001–.01  $\mu\text{m}$
34. How many pairs of gills are present in osteichthyes?  
(a) 1 (b) 2 (c) 3 (d) 4
35. The largely tropical Amazonian rain forest in south America has greatest biodiversity on earth. It is home to more than 40,000 species of plants, 3000 of fishes, 1,300 of birds, \_\_\_\_\_ of mammals, \_\_\_\_\_ of amphibians, 378 of reptiles and of more than 1,25,000 invertebrates.  
(a) 427,327 (b) 427,427  
(c) 472,372 (d) 274,273
36. The biogas plant consists of a concrete tank ( \_\_\_\_\_ feet deep) in which bio-waste are collected and slurry of dung is fed.  
(a) 1–2 (b) 10–15 (c) 30–40 (d) 40–60
37. Plasma is a straw coloured, viscous fluid constituting nearly 55% of the blood. 90–92 % of plasma is water and proteins contribute \_\_\_\_\_ % of it.  
(a) 3–4 (b) 6–8 (c) 10–15 (d) 10–12
38. How many molecules of  $\text{NADH} + \text{H}^+$  formed from one molecule of pyruvic acid inside mitochondria?  
(a) 2 (b) 4 (c) 8 (d) 16
39. How many carbon atoms are present in Arachidonic acid excluding the carboxyl carbon?  
(a) 19 (b) 20  
(c) 18 (d) 17

40. In plant cells, the vacuole can occupy up to \_\_\_\_\_ % of the volume of the cell.  
(a) 20 (b) 60 (c) 90 (d) 100
41. Adrenal cortex can be histologically divided into how many layers?  
(a) 1 (b) 2 (c) 3 (d) 4
42. How many genes are present in chromosomes X and chromosome Y, respectively?  
(a) 2968,213 (b) 2896,231 (c) 2869,312 (d) 2968,231
43. Macronutrients are generally present in the plant tissues in large amounts (in excess of \_\_\_\_\_ m mole Kg<sup>-1</sup> of the dry weight)  
(a) 5 (b) 10 (c) 15 (d) 20
44. What is the life span of Crocodile in years?  
(a) 10 (b) 20 (c) 60 (d) 30
45. How much temperature is provided to cells and recombinant DNA during heat shock?  
(a) 22°C (b) 32°C (c) 42°C (d) 72°C
46. How much % of CO<sub>2</sub> is carried in a dissolved state through plasma?  
(a) 70 (b) 7 (c) 20–25 (d) 3
47. Stomatal apparatus is made of how many components?  
(a) 1 (b) 3 (c) 4 (d) 5
48. Administration of progestogens or progestogen-estrogen combination or IUDs within \_\_\_\_\_ hours(max) of coitus have found to be very effective emergency contraceptives as they could be used to avoid possible pregnancy due to rape or causal unprotected intercourse.  
(a) 24 (b) 36 (c) 72 (d) 84
49. How many chitinous teeth are present in gizzard of cockroach?  
(a) 3 (b) 6 (c) 8 (d) 10
50. Every 100 ml of blood can deliver around how many ml of oxygen to tissue under normal physiological condition?  
(a) 4 (b) 5 (c) 14 (d) 20
51. The number of chromosomes in meiocyte of rice  
(a) 1 (b) 24 (c) 16 (d) 32
52. The number of chromosome in meiocyte of dog  
(a) 34 (b) 20 (c) 78 (d) 380
53. The size of each ovary in cm (length)  
(a) 2–4 (b) 4–6 (c) 6–8 (d) 8–10
54. At puberty, total number of primary follicle present in human female body  
(a) 60,000–80,000 (b) 1,20,000–1,60,000  
(c) 30,000–40,000 (d) 15,000–20,000
55. Menopause generally occur at which age  
(a) 45 (b) 50 (c) 55 (d) 40
56. In which year Miller did his experiment for chemical evolution of life and Watson and Crick proposed double stranded model of DNA?  
(a) 1926 (b) 1869 (c) 1953 (d) 1952
57. In which year 1st transgenic cow, Rosie, is produced (protein content of milk is 2.4 gm/lit)?  
(a) 1997 (b) 1995 (c) 1999 (d) 1993
58. In which year, Whittaker proposed a five kingdom classification?  
(a) 1935 (b) 1969 (c) 1839 (d) 1972

59. In which year, Ribosome was first observed by George Palade?  
(a) 1926 (b) 1869 (c) 1953 (d) 1952
60. How much filtrate is reabsorbed by renal tubules?  
(a) 70–80 (b) 90 (c) 99 (d) 95
61. In which year, T.O. Diener discovered viroids?  
(a) 1971 (b) 1961 (c) 1981 (d) 1991
62. In Dictyota, how many flagella are present?  
(a) 2 (b) 4 (c) 6 (d) 8
63. How many external rows of ciliated comb plates present on the body of ctenophores?  
(a) 4 (b) 6 (c) 8 (d) 10
64. Heart of crocodile posses how many chambers?  
(a) 1 (b) 2 (c) 3 (d) 4
65. How many carpels are present in flower of sem?  
(a) 1 (b) 2 (c) 3 (d) 4
66. How many petals are present in one flower of Makoi?  
(a) 4 (b) 5 (c) 3 (d) 6
67. Keel in a pea flower is formed by how many petals?  
(a) 1 (b) 2 (c) 3 (d) 5
68. Head of Cockroach is formed by fusion of how many segments?  
(a) 2 (b) 6 (c) 4 (d) 8
69. How many eggs are present in each Oothecae of Cockroach?  
(a) 14–16 (b) 12–14 (c) 10–12 (d) 8–10
70. Hind limb of frog has how digits  
(a) 3 (b) 4 (c) 5 (d) 6
71. What is the size of Ribosomes?  
(a) 15–20 nm (b) 10–15 nm (c) 20–25 nm (d) 5–10 nm
72. How many nucleus present in human RBC?  
(a) 1 (b) 2 (c) 3 (d) 0
73. Percentage wt. of carbon in human body is  
(a) 65 (b) 18.5 (c) 0.5 (d) 3.3
74. How many carbons are present in serine?  
(a) 3 (b) 2 (c) 4 (d) 5
75. Cell cycle of yeast is about  
(a) 60 min (b) 90 min (c) 30 min (d) 20 min
76. Saturation point of CO<sub>2</sub> for C<sub>4</sub>-plant is (in μ/L)  
(a) 360 (b) 450 (c) 120 (d) 200
77. How many ATP are produced when 16H<sup>+</sup> ion passed through F-unit of F<sub>0</sub>-F<sub>1</sub> particle?  
(a) 16 (b) 8 (c) 4 (d) 2
78. At which thoracic vertebra, trachea is divided into 1<sup>o</sup> bronchi-  
(a) 6th (b) 5th (c) 4th (d) 7th
79. How much % of Plasma is water?  
(a) 95–97 (b) 90–92 (c) 80–85 (d) 75–80

80. Hippocampus has how many chamber in heart?  
 (a) 3 (b) 2 (c) 4 (d) 1
81. GFR is (in ml/minute)  
 (a) 120 (b) 125 (c) 130 (d) 180
82. What is the molarity of outer part of inner medulla in Kidney (in m<sup>0</sup>% mol/litre)?  
 (a) 1200 (b) 600 (c) 900 (d) 300
83. Cranial bones are \_\_\_\_\_ in number.  
 (a) 6 (b) 8 (c) 4 (d) 10
84. Coxal bone is formed by fusion of how many bones?  
 (a) 3 (b) 6 (c) 4 (d) 2
85. The ventral portion of the mid brain consists of how many round swelling (lobes)?  
 (a) 2 (b) 4 (c) 0 (d) 3
86. The wall of eye ball is made up of how many layers?  
 (a) 1 (b) 2 (c) 3 (d) 4
87. Find out the total number of secondary messenger from the following?  
**ATP, AMP, IP<sub>3</sub>, Ca<sup>2+</sup>**  
 (a) 1 (b) 2 (c) 3 (d) 4
88. Each eye of cockroach is consisting of about how many ommatidia?  
 (a) 1000 (b) 2000 (c) 4000 (d) 3000
89. How many genes are present in a human cell?  
 (a) 20,000 (b) 30,000 (c) 50,000 (d) 80,000
90. How many genes are present in 1st chromosome of human?  
 (a) 2968 (b) 2986 (c) 231 (d) 132

### Answer Keys

|         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d)  | 2. (c)  | 3. (b)  | 4. (a)  | 5. (d)  | 6. (b)  | 7. (b)  | 8. (c)  | 9. (b)  | 10. (c) |
| 11. (b) | 12. (b) | 13. (c) | 14. (c) | 15. (c) | 16. (c) | 17. (d) | 18. (a) | 19. (c) | 20. (b) |
| 21. (b) | 22. (a) | 23. (a) | 24. (c) | 25. (a) | 26. (b) | 27. (a) | 28. (d) | 29. (b) | 30. (d) |
| 31. (c) | 32. (b) | 33. (a) | 34. (d) | 35. (b) | 36. (b) | 37. (b) | 38. (b) | 39. (a) | 40. (c) |
| 41. (c) | 42. (d) | 43. (b) | 44. (c) | 45. (c) | 46. (b) | 47. (b) | 48. (c) | 49. (b) | 50. (b) |
| 51. (b) | 52. (c) | 53. (a) | 54. (b) | 55. (b) | 56. (c) | 57. (a) | 58. (b) | 59. (c) | 60. (c) |
| 61. (a) | 62. (a) | 63. (c) | 64. (d) | 65. (a) | 66. (b) | 67. (b) | 68. (b) | 69. (a) | 70. (c) |
| 71. (a) | 72. (d) | 73. (b) | 74. (a) | 75. (b) | 76. (a) | 77. (b) | 78. (b) | 79. (b) | 80. (b) |
| 81. (b) | 82. (c) | 83. (b) | 84. (a) | 85. (c) | 86. (c) | 87. (c) | 88. (b) | 89. (b) | 90. (a) |

# Mock Test-2

- Specialised procedure to form an embryo in the laboratory in which a sperm is directly injected in to the ovum is
  - ZIFT
  - GIFT
  - ICSI
  - AI
- Which one of the following structures between two adjacent cells is an effective transport pathway?
  - Plasmodesmata
  - Plastoquinones
  - Endoplasmic reticulum
  - Plasmalemma
- Multicellular loose tissue organisation found in
  - Protista
  - Fungi
  - Archaea
  - Monera
- Which of the following plants can express Bt genes: **Cotton, corn, rice, tomato, potato, soyabean, brinjal**. Find total numbers from the following
  - 3
  - 4
  - 5
  - 7
- Ovary is one chambered but it become two chambered due to the formation of false septum in
  - mustard
  - dianthus
  - merigold
  - sunflower
- Which of the following are free living nitrogen fixer in soil
  - Rhizobium
  - Alnus
  - Frankia
  - Nostoc
- Leydig cells are found in
  - ovaries and secrete progesterone
  - adrenal cortex and secrete adrenalin
  - seminiferous tubules and provide nutrition to germ cells
  - seminiferous tubules and secrete androgens
- Which one of the following cannot be explained on the basis of Mendel's Law of Dominance?
  - The discrete unit controlling a particular character is called a factor
  - Out of one pair of factors one is dominant, and the other recessive
  - Alleles do not show any blending and both the characters recover as such in  $F_2$  generation
  - Factors occur in pairs
- Apomictic embryos in Citrus arise from
  - synergids
  - maternal sporophytic tissue in ovule
  - antipodal cells
  - diploid egg

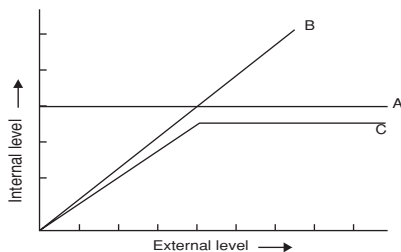
10. One example of animals having a single opening to the outside that serves both mouth as well as anus is
- (a) Octopus (b) Asterias  
(c) Ascidia (d) Dugesia
11. Select the correct statement from the ones given below
- (a) Barbiturates when given to criminals make them tell the truth  
(b) Morphine is often given to persons who have undergone surgery as a pain killer  
(c) Chewing tobacco lowers blood pressure and heart rate  
(d) Cocaine is given to patients after surgery as it stimulates recovery
12. Select correct statement from the following
- A:** Wheezing sound is produced in asthma  
**B:** Emphysema is chronic disorder and one of its major cause is cigarette smoking  
**C:** Pneumotoxic centre present in medulla
- (a) A and B (b) A and C  
(c) B and C (d) A, B and C
13. Phloem of gymnosperm contain
- (a) sieve tubes (b) albuminous cells  
(c) companion cells (d) tracheids
14. Many fungi belong to the following genera causes ringworm
- (a) Microsporium (b) Trichophyton  
(c) Epidermophyton (d) All
15. Which one of the following is not a micronutrient?
- (a) Molybdenum (b) Calcium  
(c) Zinc (d) Boron
16. Membrane-bound organelles are absent in
- (a) Saccharomyces (b) Nostoc  
(c) Cladophora (d) Plasmodium
17. At puberty how many primary follicles found in female body
- (a) 60,000–80,000 (b) 20,000–40,000  
(c) 1,20,000–1,60,000 (d) 30,000–60,000
18. Select the correct statement from the following
- (a) Biogas is produced by the activity of aerobic bacteria on animal waste  
(b) Methanobacterium is an anerobic bacterium found in rumen of cattle  
(c) Biogas, commonly called gobar gas, is pure ethane  
(d) Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria
19. Select the two statements out of the four (1–4) given below about lac operon.
- (1) Glucose or galactose may bind with the repressor and inactivate it  
(2) In the presence of lactose, the repressor binds with the operator region  
(3) The *y*-gene codes for permease  
(4) This was elucidated by Francois Jacob and Jacques Monod
- The correct statements are
- (a) (2) and (3) (b) (1) and (3)  
(c) (3) and (4) (d) (1) and (2)

20. Keel is characteristic of the flowers of  
(a) gulmohur (b) cassia  
(c) calotropis (d) pea
21. The kind of epithelium which forms the inner walls of alveoli is  
(a) cuboidal epithelium (b) columnar epithelium  
(c) ciliated columnar epithelium (d) squamous epithelium
22. Which one of the following has its own DNA?  
(a) Chloroplast (b) Dictyosome  
(c) Lysosome (d) Peroxisome
23. Transfer of pollen grains from the anther to the stigma of same flower of the same plant is called  
(a) xenogamy (b) geitonogamy  
(c) karyogamy (d) autogamy
24. The genotype of a plant showing the dominant phenotype can be determined by  
(a) test cross (b) dihybrid cross  
(c) pedigree analysis (d) back cross
25. PGA as the first CO<sub>2</sub> fixation product was discovered in photosynthesis of  
(a) pteridophyte (b) gymnosperm  
(c) angiosperm (d) alga
26. Study the four statements (1–4) given below and select the two correct ones out of them.  
(1) A lion eating a deer and a sparrow feeding on grain are ecologically similar in being consumers  
(2) Predator star fish *Pisaster* helps in maintaining species diversity of some invertebrates  
(3) Predators ultimately lead to the extinction of prey species  
(4) Production of chemicals such as nicotine, strychnine by the plants are metabolic disorders  
The two correct statements are  
(a) (2) and (3) (b) (3) and (4)  
(c) (1) and (4) (d) (1) and (2)
27. Seminal plasma in human males is rich in  
(a) fructose and calcium (b) glucose and calcium  
(c) DNA and testosterone (d) ribose and potassium
28. ABO blood groups in humans are controlled by the gene I. It has three alleles-I<sup>A</sup>, I<sup>B</sup> and i. Since there are three different alleles, six different genotypes are possible. How many phenotypes can occur?  
(a) Three (b) One  
(c) Four (d) Two
29. Which variety of wheat has high protein content?  
(a) Himgiri (b) P 1542  
(c) Sonalika (d) Atlas 66
30. True about Nucleopolyhedrovirus (biocontrol agent)  
(a) species-non specific  
(b) narrow spectrum  
(c) harmful to non target insect also  
(d) has negative impact on plant, mammals, birds



31. Widal test is used for the diagnosis of  
(a) Malaria (b) AIDS  
(c) Plague (d) Typhoid
32. Injury to adrenal medulla is likely to affect the secretion of which one of the following?  
(a) Aldosterone  
(b) Both androstenedione and dehydroepiandrosterone  
(c) Adrenalin  
(d) Cortisol
33. High uric acid be the cause of  
(a) tetany (b) anaemia  
(c) angina pectoris (d) gout
34. Which one of the following pairs is incorrectly matched?  
(a) Thyroid follicles- $T_3$  and  $T_4$  (secretion)  
(b) Somatostatin-Alpha cells (source)  
(c) Corpus luteum-Relaxin (secretion)  
(d) Insulin-Diabetes mellitus (disease)
35. Select the correct statement from the ones given below with respect to dihybrid cross.  
(a) Tightly linked genes on the same chromosome show higher recombinations  
(b) Genes far apart on the same chromosome show very few recombinations  
(c) Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones  
(d) Tightly linked genes on the same chromosome show very few recombinations
36. Which one of the following statements in regard to the excretion by the human kidneys is correct?  
(a) Descending limb of Loop of Henle is impermeable to water  
(b) Distal convoluted tubule is incapable of reabsorbing  $HCO_3$   
(c) Nearly 99 per cent of the glomerular filtrate is reabsorbed by the renal tubules  
(d) Ascending limb of loop of Henle is impermeable to electrolytes
37. The vomit centre situated at  
(a) hypothalamus (b) pons  
(c) cerebellum (d) medulla
38. The full form of GFC  
(a) glucose fructose carrier (b) Grazing food chain  
(c) grafted food crop (d) gross food capacity
39. Which of the following disease is related to circulatory system (find total no)  
**Hypertension, CAD, angina, uremia, osteoporosis, tetany, gout**  
(a) 2 (b) 3  
(c) 1 (d) 5
40. Ovary is inferior in the flowers of  
(a) peach (b) plum  
(c) mustard (d) guava
41. Which one of the following is used as vector for cloning genes into higher plants?  
(a) Baculovirus (b) Agrobacterium tumifaciens  
(c) Rhizopus nigricans (d) Retrovirus

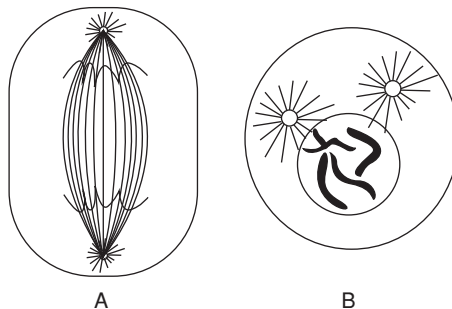
42. Select incorrect matching
- (a) GCA-Ala (b) GUU-Val  
(c) AAU-Asn (d) UCC-Leu
43. Which one of the following is an example of in situ conservation?
- (a) botanical garden (b) Seed bank  
(c) Sacred groves (d) zoological park
44. Which one of the following restriction enzyme can cut Tet<sup>R</sup> site of pBR322
- (a) Pvu I, Pst I (b) BamH I, Sal I  
(c) Pvu II (d) EcoR I
45. Which one of the following statements is correct with respect to Cancer?
- (a) The cancer cell have the full ability of contact inhibition  
(b) Metastasis is shown by Benign tumors  
(c) The cancer causing agents are known as oncogenes  
(d) c-onc or proto oncogenes when activated can cause cancer
46. Which of the following is used to initiate flowering and synchronising fruit-set in pineapples
- (a) gibberellin (b) phytochrome  
(c) ethylene (d) auxin
47. The figure given below is a diagrammatic representation of response of organisms to abiotic factors. What do A, Band C represent respectively?







| A                     | B                 | C                 |
|-----------------------|-------------------|-------------------|
| (a) conformer         | regulator         | partial regulator |
| (b) regulator         | partial regulator | conformer         |
| (c) partial regulator | regulator         | conformer         |
| (d) regulator         | conformer         | partial regulator |

48. Find the total number of algae belongs to class phaeophyceae from the following Volvox, **ectocarpus**, gelidium, **dictyota**, ficus, **laminaria**, porphyra, chara, gracilaria, cladophora
- (a) 3 (b) 4  
(c) 2 (d) 5
49. The technical term used for the androecium in a flower of Pea (*Pisum sativum*) is
- (a) monadelphous (b) diadelphous  
(c) polyandrous (d) polyadelphous
50. Potato spindle tuber disease is caused by
- (a) virus (b) viriods  
(c) fungi (d) bacteria

51. The permissible use of the technique amniocentesis is for  
 (a) detecting sex of the unborn foetus  
 (b) artificial insemination  
 (c) transfer, of embryo into the uterus of a surrogate mother  
 (d) detecting any genetic abnormality
52. During mitosis ER and nucleolus begin to disappear at  
 (a) late prophase  
 (b) early metaphase  
 (c) late metaphase  
 (d) early prophase
53. The free-living, anaerobic nitrogen-fixer is  
 (a) Beijerinckia  
 (b) Rhodospirillum  
 (c) Rhizobium  
 (d) Azotobacter
54. DNA or RNA segment tagged with a radioactive molecule is called  
 (a) vector  
 (b) probe  
 (c) clone  
 (d) plasmid
55. Darwin's finches are a good example of  
 (a) industrial melanism  
 (b) connecting link  
 (c) divergent evolution  
 (d) convergent evolution
56. The length of fallopian tube is  
 (a) 5–6 cm  
 (b) 10–12 cm  
 (c) 14–16 cm  
 (d) 2–4 cm
57. What is false about WBCs in humans?  
 (a) Neutrophils and monocytes are phagocytes  
 (b) Basophiles secrete histamine, serotonin, heparin  
 (c) Eosinophiles associated with allergic reaction  
 (d) Lymphocytes are of 4 major type
58. Which stages of cell division do the following figures A and B represent respectively?



| A                 | - | B         |
|-------------------|---|-----------|
| (a) Metaphase     | - | Telophase |
| (b) Telophase     | - | Metaphase |
| (c) Late anaphase | - | Prophase  |
| (d) Prophase      | - | Anaphase  |

59. Which of the following are inclusion bodies
- (a) Phosphate granules (b) Glycogen granules  
(c) Gas vacuoles (d) all
60. The common nitrogen-fixer in paddy fields is
- (a) Rhizobium (b) Azospirillum  
(c) Oscillatoria (d) Frankia
61. The principal nitrogenous excretory compound in humans is synthesised
- (a) in kidneys but eliminated mostly through liver  
(b) in kidneys as well as eliminated by kidneys  
(c) in liver and also eliminated by the same through bile  
(d) in the liver, but eliminated mostly through kidneys
62. Carrier ions like  $\text{Na}^+$  facilitate the absorption of substance like
- (a) amino acids and glucose (b) glucose and fatty acids  
(c) fatty acids and glycerol (d) fructose and Some amino acids
63. Which one of the following symbols and its representation, used in human pedigree analysis is correct?
- (a)  = Mating between relatives (b)  = Unaffected male  
(c)  = Unaffected female (d)  = Male affected
64. Which two of the following changes (1–4) usually tend to occur in the plain dwellers when they move to high altitudes (3,500 m or more)?
- (1) Increase in red blood cell size  
(2) Increase in red blood cell production  
(3) Decreasing breathing rate  
(4) Decreasing the binding affinity of hemoglobin
- (a) (2) and (3) (b) (3) and (4)  
(c) (2) and (4) (d) (1) and (2)
65. Aldosterone helps in maintenance of
- (a) electrolyte (b) body fluid volume  
(c) blood pressure (d) All
66. If for some reason our goblet cells are non functional, this will adversely affect
- (a) production of rennin  
(b) secretion of cerumen  
(c) maturation of sperms  
(d) smooth movement of food down the intestine
67. The loose sheath of glycocalyx known as
- (a) capsule (b) cell wall  
(c) slime layer (d) mesosome
68. Which one of the following statements about all the four of Physalia, obelia, ctenoplana and sea fan is correct?
- (a) all are triblastic  
(b) digestion is both intra cellular and extra cellular  
(c) all posses cnidoblast  
(d) All are bilaterally symmetrical

69. The first movements of the foetus and appearance of hair on its head are usually observed during which month of pregnancy?
- (a) Fourth month (b) Fifth month  
(c) Sixth month (d) Third month
70. Select the total number from the following which have one ovule in an ovary?  
**wheat, watermelon, papaya, paddy, mango, orchid**
- (a) 2 (b) 3  
(c) 1 (d) 4
71. Which one of the following kinds of animals are triploblastic acoelomate?
- (a) Taenia (b) torpedo  
(c) tusk chell (d) trygon
72. Select incorrect matching?
- (a) Petromyzon – 6–15 pairs of gill slits (b) Labeo – 4 pair of gill slits  
(c) Spiracles in cockroach – 10 pairs (d) Gizzard of cockroach – 8 chitinous teeth
73. Intra Uterine Devices (IUDs) from the following are
- (a) Cu T (b) Cu 7  
(c) Multiload 375 (d) All
74. Copper centres are present in which complex
- (a) complex I (b) complex II  
(c) complex III (d) complex IV
75. Restriction endonucleases are enzymes which
- (a) make cuts at specific positions within the DNA molecule  
(b) recognize a specific nucleotide sequence for binding of DNA ligase  
(c) restrict the action of the enzyme DNA polymerase  
(d) remove nucleotides from the ends of the DNA molecule
76. Which one of the following is not a lateral meristem?
- (a) Intrafascicular cambium (b) Interfascicular cambium  
(c) Phellogen (d) Intercalary meristem
77. In India, the Air (prevention and control of pollution) Act came into force in
- (a) 1981 (b) 1978  
(c) 1918 (d) 1997
78. Which of the following is not a function of gibberellins
- (a) Delay senescence  
(b) improve shape of apple  
(c) increase length of grapes stalks  
(d) speed down the malting process in brewing industry
79.  $C_4$ -plants are more efficient in photosynthesis than  $C_3$ -plants due to
- (a) higher leaf area  
(b) presence of larger number of chloroplasts in the leaf cells  
(c) presence of thin cuticle  
(d) lower rate of photorespiration
80. Algae have cell wall made up of
- (a) cellulose, galactans and mannans (b) hemicellulose, pectins and proteins  
(c) pectins, cellulose and proteins (d) cellulose, hemicellulose and pectins

81. Some hyperthermophilic organisms that grow in highly acidic (pH 2) habitats belong to the two groups called  
(a) eubacteria and archaea (b) cyanobacteria and diatoms  
(c) protists and mosses (d) liverworts and yeasts
82. Genetic engineering has been successfully used for producing  
(a) transgenic mice for testing safety of polio vaccine before use in humans  
(b) transgenic models for studying new treatments for certain cardiac diseases  
(c) transgenic cow-Rosie which produces high fat milk for making ghee  
(d) animals like bulls for farm work as they have super power
83. Some of the characteristics of Bt cotton are  
(a) long fibre and resistance to aphids  
(b) medium yield, long fibre and resistance to beetle pests  
(c) high yield and production of toxic protein crystals which kill dipteran pests  
(d) high yield and resistance to bollworms
84. Spring wood differs from autumn wood in  
(a) having high density (b) having dark colour  
(c) having less xylary element (d) having vessel with wider lumen
85. Satellite DNA is useful tool in  
(a) organ transplantation (b) Sex determination  
(c) forensic science (d) genetic engineering
86. The second maturation division of the mammalian ovum occurs  
(a) shortly after ovulation before the ovum makes entry into the Fallopian tube  
(b) until after the ovum has been penetrated by a sperm  
(c) until the nucleus of the sperm has fused with that of the ovum  
(d) in the Graafian follicle following the first maturation division
87. Which one of the following does not follow the central dogma of molecular biology?  
(a) Pea (b) Mucor  
(c) Chlamydomonas (d) TMV
88. Mark the odd one.  
(a) Endometrium (b) Corpus luteum  
(c) Acrosome (d) Graafian follicle
89. Identify the true statements –  
I. Abstinence from drugs of dependence causes withdrawal symptoms but not craving.  
II. Chikungunya is confirmed by Widal test.  
III. Rheumatoid arthritis which affects many people in our society is an auto-immune disease.  
IV. AIDS was first reported in 1981 and is caused by a member of a group of viruses called retroviruses  
V. Benign tumors are normally considered with metastasis.  
VI. Most powerful stimulant is cocaine.  
(a) I, II, V (b) I, III, IV, VI  
(c) III, V, VI (d) III, IV, V
90. Wind pollinated flowers are  
(a) small, brightly coloured, producing large number of pollen grains  
(b) small, producing large number of dry pollen grains  
(c) large, producing abundant nectar and pollen  
(d) small, producing nectar and dry pollen

**Answer Keys**

|         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (a)  | 3. (b)  | 4. (d)  | 5. (a)  | 6. (d)  | 7. (d)  | 8. (c)  | 9. (b)  | 10. (d) |
| 11. (b) | 12. (a) | 13. (b) | 14. (d) | 15. (b) | 16. (b) | 17. (c) | 18. (b) | 19. (c) | 20. (d) |
| 21. (d) | 22. (a) | 23. (d) | 24. (a) | 25. (d) | 26. (d) | 27. (a) | 28. (c) | 29. (d) | 30. (b) |
| 31. (d) | 32. (c) | 33. (d) | 34. (b) | 35. (d) | 36. (c) | 37. (d) | 38. (b) | 39. (b) | 40. (d) |
| 41. (b) | 42. (d) | 43. (c) | 44. (b) | 45. (d) | 46. (c) | 47. (a) | 48. (a) | 49. (b) | 50. (b) |
| 51. (d) | 52. (a) | 53. (b) | 54. (b) | 55. (c) | 56. (b) | 57. (d) | 58. (c) | 59. (d) | 60. (c) |
| 61. (d) | 62. (d) | 63. (a) | 64. (c) | 65. (d) | 66. (d) | 67. (c) | 68. (b) | 69. (b) | 70. (b) |
| 71. (a) | 72. (d) | 73. (d) | 74. (d) | 75. (a) | 76. (d) | 77. (a) | 78. (d) | 79. (d) | 80. (a) |
| 81. (a) | 82. (a) | 83. (c) | 84. (d) | 85. (c) | 86. (b) | 87. (d) | 88. (c) | 89. (b) | 90. (b) |

# Mock Test-3

- The most important factor which determined the increase in human population in India during the 20th century is
  - Natality
  - Mortality
  - Immigration
  - Emigration
- Vascular bundles in monocotyledons are considered closed because
  - Xylem is surrounded all around by phloem
  - There are no vessels with perforations
  - A bundle sheath surrounds each bundle
  - There is no secondary growth
- When there are two haploid nuclei per cell in some fungi before the formation of diploid, this stage is called
  - diplotene
  - diplophase
  - dikaryophase
  - dikaryote
- In blood group typing in human, if an allele contributed by one parent is  $I^A$  and an allele contributed by the other parent is  $i$ , the resulting blood group of the offspring will be
  - A
  - B
  - AB
  - O
- A population growing in a habitat with limited resources shows four phases of growth in the following sequence
  - Acceleration - Deceleration - Lag phase - Asymptote
  - Asymptote - Acceleration - Deceleration - Lag phase
  - Lag phase - Acceleration - Deceleration - Asymptote
  - Acceleration - Lag phase - Deceleration - Asymptote
- Necrosis in crops is due to the deficiency of
  - Ca, K, S and Mo
  - N, K, S and Mo
  - N, S, Fe and Zn
  - Mg, S, Mn and Ca
- Presence of bundle sheath is a characteristics of
  - Xerophytic plants
  - Members of grass family
  - $C_4$  plants
  - $C_3$  plants
- Which one of the following would not lead to formation of clones?
  - Double fertilization
  - Apomixis
  - Vegetative reproduction
  - Tissue culture
- The variation/difference in the offsprings of a species from their parents constitutes an important component of
  - genetics
  - speciation
  - species fixation
  - heredity



10. If two pea plants having red (dominant) coloured flowers with unknown genotypes are crossed, 75% of the flowers are red and 25% are white. The genotypic constitution of the parents having red coloured flowers will be
  - (a) both homozygous
  - (b) one homozygous and other heterozygous
  - (c) both heterozygous
  - (d) both hemizygous
11. If the total amount of adenine and thymine in a double-stranded DNA is 60%, the amount of guanine in this DNA will be
  - (a) 15%
  - (b) 20%
  - (c) 30%
  - (d) 40%
12. The protein products of the following Bt toxin genes cry I Ac and cry II Ab are responsible for controlling
  - (a) bollworm
  - (b) roundworm
  - (c) moth
  - (d) fruit fly
13. In a flowering plant, the pollen tube first arrives in
  - (a) egg
  - (b) an antipodal cell
  - (c) a synergist
  - (d) central cell
14. A peculiar odour that prevails in marshy areas and cow-sheds is on account of a gas produced by
  - (a) mycoplasma
  - (b) archaebacteria
  - (c) slime moulds
  - (d) cyanobacteria
15. A germplasm collection is a
  - (a) Collection of specimens of all the species of an area in a herbarium or botanical garden
  - (b) Collection of modern varieties of a crop
  - (c) Collection of plants or seeds having diverse alleles of all genes in a crop
  - (d) Collection of seeds or pollen of rare and threatened species of a group or area
16. Walter Sutton is famous for his contribution to
  - (a) Genetic engineering
  - (b) Totipotency
  - (c) Quantitative genetics
  - (d) Chromosomal theory of inheritance
17. The reaction, Amino acid + ATP  $\rightarrow$  Aminoacyl AMP + P-P depicts
  - (a) Amino acid assimilation
  - (b) Amino acid transformation
  - (c) Amino acid activation
  - (d) Amino acid translocation
18. The problem of blindness in poor countries can be taken care of by using the following
  - (a) golden rice
  - (b) transgenic tomato
  - (c) transgenic maize
  - (d) Bt brinjal
19. The transcription of any gene is the indication of its
  - (a) induction
  - (b) activity
  - (c) stimulation
  - (d) hypersensitivity
20. In  $C_4$ -plants, the bundle sheath cells
  - (a) have thin walls to facilitate gaseous exchange
  - (b) have large intercellular spaces
  - (c) are rich in PEP carboxylase
  - (d) have a high density of chloroplasts

21. In root nodules of legumes, leghaemoglobin is important because it
- (a) transports oxygen to the root nodule
  - (b) acts as an oxygen scavenger
  - (c) provides energy to the nitrogen fixing bacterium
  - (d) acts as a catalyst in transamination
22. Darwin judged the fitness of an individual by
- (a) ability to defend itself
  - (b) strategy to obtain food
  - (c) number of offsprings
  - (d) dominance over other individuals
23. Which of the following statements is wrong?
- (a) Pollen grains remain viable for several months because their outer covering is made of sporopollenin.
  - (b) No enzyme can degrade sporopollenin.
  - (c) Pollen grains are well represented in fossil strata due to sporopollenin.
  - (d) Pollen wall has cavities containing proteins.
24. In plant biotechnology, PEG is used in
- (a) protoplast isolation
  - (b) cell culture preparation
  - (c) protoplast fusion
  - (d) hardening
25. Analogous structures are
- (a) anatomically different but performing similar functions
  - (b) anatomically similar but performing different functions
  - (c) anatomically similar and functioning similarly
  - (d) anatomically different and functioning differently
26. A polygenic trait is controlled by 3 genes: A, B and C. In a cross  $AaBbCc \times AaBbCc$ , the phenotypic ratio of the offsprings was observed as  $1:6:x:20:x:6:1$ . What is the possible value of x?
- (a) 3
  - (b) 9
  - (c) 15
  - (d) 25
27. A transgenic rice (golden rice) has been developed for increased content of
- (a) vitamin A
  - (b) vitamin B<sub>1</sub>
  - (c) vitamin C
  - (d) vitamin D
28. When the conditions are dry, a grass leaf curls inward to minimize water loss due to presence of
- (a) thick cuticle
  - (b) large xylem cavities
  - (c) parallel venation
  - (d) bulliform cells
29. The chromosome constitution  $2n - 2$  of an organism represents
- (a) monosomic
  - (b) nullisomic
  - (c) haploid
  - (d) trisomic
30. Meristem culture is practised in horticulture to get
- (a) somaclonal variation
  - (b) haploids
  - (c) virus-free plants
  - (d) slow-growing callus
31. Tendril in cucurbita & Thorn in Bougainvillea are example of
- (a) convergent evolution
  - (b) radiation
  - (c) divergent evolution
  - (d) co-evolution
32. Haemoglobin is
- (a) an oxygen carrier in human blood
  - (b) a protein used as food supplement
  - (c) an oxygen scavenger in root nodules
  - (d) a plant protein with high lysine content

33. Stomatal opening is affected by
- Nitrogen concentration, carbon dioxide concentration and light
  - carbon dioxide concentration, temperature and light
  - nitrogen concentration, light and temperature
  - carbon dioxide concentration, nitrogen concentration and temperature
34. Taxonomic hierarchy refers to
- step-wise arrangement of all categories for classification of plants and animals
  - a group of senior taxonomists, who decide the nomenclature of plants and animals
  - a list of botanists or zoologists, who have worked on taxonomy of a species or group
  - classification of a species based on fossil record
35. Which of the following get accumulated in the vacuoles of guard cells during stomatal opening?
- Water, calcium and magnesium
  - Starch, potassium and chloride ions
  - Malate, sodium and potassium ions
  - Malate, potassium and chloride ions
36. Which of the following is the most accepted theory for movement of water through plants?
- Cohesion-tension-transpiration pull theory
  - Capillarity
  - Passive transport
  - Root pressure
37. Scutellum in a caryopsis represents
- outermost layer of endosperm
  - a sheath that protects the radical
  - the place where the seed is attached to raphe
  - a cotyledon
38. In an annual ring, the light coloured part is known as
- early wood
  - late wood
  - heartwood
  - sapwood
39. Natural cytokinins are synthesised in tissue that are
- senescent
  - dividing rapidly
  - storing food material
  - differentiating
40. Resemblance of one organism to another for protection and hiding is
- mimicry
  - predation
  - adaptation
  - camouflage
41. The rough endoplasmic reticulum (RER) in the cells are because of the presence of
- mitochondria associated with ER
  - ribosomes on the surface of ER
  - volutin granules on the surface of ER
  - sulphur granules on the surface of ER
42. Elaioplasts store
- starch
  - proteins
  - fats
  - essential amino acids
43. Aggregates of lymphoid tissue present in the distal portion of the small intestine are known as
- villi
  - Peyer's patches
  - rugae
  - choroid plexus
44. Mendel's principle of segregation means that the gametes always receive
- one pair of alleles
  - one quarter of the genes
  - one of the paired alleles
  - any pair of alleles

45. Which of the following vitamins help in absorption of calcium ion from intestine
- (a) Vitamin A (b) Vitamin D  
(c) Vitamin C (d) Vitamin B
46. Somatostatin
- (a) stimulates glucagon release while inhibits insulin release  
(b) stimulates release of insulin and glucagon  
(c) inhibits release of insulin and glucagon  
(d) inhibits glucagon release while stimulates insulin release
47. Starch grain in pea plant shows
- (a) Complete Dominance  
(b) Incomplete Dominance  
(c) Co-Dominance  
(d) Epistasis
48. ELISA assay
- (a) uses complement mediated cell lysis  
(b) uses a radiolabelled second antibody  
(c) involves addition of substrate which is converted into coloured end product  
(d) requires red blood cells
49. 'Complete competitors cannot coexist' is true for
- (a) character displacement (b) competitive exclusion  
(c) primary succession (d) Secondary succession
50. mRNA directs the building of proteins through a sequence of
- (a) introns (b) codons  
(c) exons (d) anticodons
51. Foramen ovale
- (a) connects the two atria in the foetal heart  
(b) is a condition in which the heart valves do not completely close  
(c) is a shallow depression in the interventricular septum  
(d) is a connection between the pulmonary trunk and the aorta in the foetus
52. Which of the following is a Gram negative bacterium?
- (a) *Escherichia coli* (b) *Bacillus subtilis*  
(c) *Streptomyces coelicolor* (d) *Ampycolatopsis orientalis*
53. What is meant by the term 'Darwin fitness'?
- (a) The ability to survive and reproduce (b) High aggressiveness  
(c) Healthy appearance (d) Physical strength
54. Absence of one sex chromosome causes
- (a) Turner's syndrome (b) Klinefelter's syndrome  
(c) Down's syndrome (d) Tay-Sach's syndrome
55. Comparing small and large cells, which statement is correct?
- (a) Small cells have a small surface area per volume ratio  
(b) Exchange rate of nutrients is fast with large cells  
(c) Small cells have a large surface area per volume ratio  
(d) Exchange rate of nutrients is slow with small cells

56. The number of autosomes in human primary spermatocyte is  
(a) 46 (b) 44  
(c) 23 (d) 22
57. The most abundant molecule in cell is  
(a) Water (b) Carbohydrate  
(c) Lipid (d) Protein
58. How many chromosomes will the cell have at  $G_1$ , after S and after M-phase respectively, if it has 14 chromosomes at interphase?  
(a) 14, 14, 7 (b) 14, 14, 14  
(c) 7, 7, 7 (d) 7, 14, 14
59. The Golgi apparatus  
(a) is found only in animals (b) is found in prokaryotes  
(c) is a site of rapid ATP production (d) modifies and packages proteins
60. Glycolysis  
(a) takes place in the mitochondria  
(b) produces no ATP  
(c) has no connection with electron transport chain  
(d) reduces two molecules of  $NAD^+$  for every glucose molecule processed
61. Total number of all species of organisms in a given region is known as the region's  
(a) biota (b) flora  
(c) fauna (d) diversity
62. The arthropod exoskeleton is composed of  
(a) Globulin  
(b) Chitin  
(c) several kinds of proteins  
(d) single complex protein called arthropodin
63. C-DNA is  
(a) Copy DNA (b) Conjugated DNA  
(c) Chimeric DNA (d) Complex DNA
64. Maltose gives rise to two molecules of \_\_\_\_\_ on hydrolysis  
(a) fructose (b) lactose  
(c) glucose (d) sucrose
65. Sigmoid growth curve is represented by  
(a)  $dN/dt = rN$  (b)  $dN/dt = rN(1 - N/K)$   
(c)  $Nt = N_0 + B + I - D - E$  (d)  $dN/dt = 1 - N/K$
66. Beadle and Tatum showed that each kind of mutant bread mould they studied lacked a specific enzyme. Their experiments demonstrated that  
(a) cells need specific enzymes in order to function  
(b) genes are made of DNA  
(c) genes carry information for making proteins  
(d) Enzymes are required to repair damaged DNA information
67. DNA has equal number of adenine and thymine residues ( $A = T$ ) and equal number of guanine and cytosine ( $G = C$ ). These relationships are known as  
(a) Chargaff's rule (b) Coulomb's law  
(c) Le-Chatelier's principle (d) Van't Hoff plot

68. 'Balancing selection' promotes  
(a) homozygotes (b) heterozygotes  
(c) polyploids (d) recessive traits
69. Vomiting centre is located in the  
(a) medulla oblongata (b) stomach and sometimes in duodenum  
(c) GI tract (d) hypothalamus
70. How many bio-geographical regions are present in India?  
(a) 3 (b) 4  
(c) 7 (d) 10
71. Which of the following organs in earthworm neutralizes humic acid present in humus?  
(a) Typhlosole (b) Calciferous glands  
(c) Intestinal caecum (d) Gizzard
72. Fertilized eggs of *P. americana* are encased in  
(a) ootheca (b) cocoon  
(c) genital chamber (d) phallomere
73. Insufficient quantities of antidiuretic hormone in blood lead to  
(a) diabetes mellitus (b) glycosuria  
(c) diabetes insipidus (d) uremia
74. Sphincter of Oddi guards  
(a) hepato-pancreatic duct (b) common bile duct  
(c) pancreatic duct (d) cystic duct
75. Graveyard for RBCs is  
(a) liver (b) spleen  
(c) kidney (d) lymph glands
76. Blood cells involved in inflammatory reactions are  
(a) basophils (b) neutrophils  
(c) eosinophils (d) monocytes
77. To obtain a standard ECG, a patient is connected to the machine with three electrodes  
(a) one to each wrist and to the left ankle  
(b) one to each ankle and to the left wrist  
(c) one to each wrist and to the left chest region  
(d) one to each ankle and to the left chest region
78. The clavicle articulates with \_\_\_\_\_ of scapula.  
(a) acromion process (b) glenoid cavity  
(c) acetabulum cavity (d) ball and socket joint
79. The age of pyramid with broad base indicates  
(a) high percentage of young individuals (b) low percentage of young individuals  
(c) high percentage of old individuals (d) low percentage of old individuals
80. Thymosin hormone is secreted by  
(a) thyroid gland (b) parathyroid gland  
(c) thymus gland (d) hypothalamus gland
81. Which of the following groups is absolutely essential functional component of the ecosystem?  
(a) Producers (b) Producers and herbivores  
(c) Producers and detritivores (d) Detritivores

82. Phagocytosis and pinocytosis are collectively termed as  
 (a) endocytosis (b) suspension feeding  
 (c) omnivores (d) mucous trap
83. PCR proceeds in three distinct steps governed by temperature. They are in order of  
 (a) denaturation, annealing, synthesis (b) synthesis, annealing, denaturation  
 (c) annealing, synthesis, denaturation (d) denaturation, synthesis, annealing
84. Corpus luteum releases  
 (a) oestrogen (b) progesterone  
 (c) oestrogen and progesterone (d) androgen
85. Which of the following organs is devoid of glands?  
 (a) uterus (b) vagina  
 (c) vulva (d) oviduct
86. Primary spermatocyte differs from spermatogonium in  
 (a) number of chromosomes (b) size and volume  
 (c) DNA content (d) size of chromosomes
87. In human, cleavage divisions are  
 (a) slow and synchronous (b) fast and synchronous  
 (c) slow and asynchronous (d) fast and asynchronous
88. The basic unit of study in Ecology is  
 (a) population (b) organism  
 (c) community (d) species
89. Which of the following is example of ex-situ conservation?  
 (a) Botanical garden (b) Sacred groves  
 (c) Wild life safari park (d) Both (a) and (c)
90. How many species of birds are there in Greenland?  
 (a) 1400 (b) 105  
 (c) 1300 (d) 56

### Answer Keys

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a)  | 2. (d)  | 3. (c)  | 4. (a)  | 5. (c)  | 6. (a)  | 7. (c)  | 8. (a)  | 9. (a)  | 10. (c) |
| 11. (b) | 12. (c) | 13. (c) | 14. (b) | 15. (c) | 16. (d) | 17. (c) | 18. (a) | 19. (b) | 20. (d) |
| 21. (b) | 22. (c) | 23. (d) | 24. (c) | 25. (a) | 26. (c) | 27. (a) | 28. (d) | 29. (b) | 30. (c) |
| 31. (c) | 32. (a) | 33. (b) | 34. (a) | 35. (d) | 36. (a) | 37. (d) | 38. (a) | 39. (b) | 40. (a) |
| 41. (b) | 42. (c) | 43. (b) | 44. (c) | 45. (b) | 46. (c) | 47. (b) | 48. (c) | 49. (b) | 50. (b) |
| 51. (a) | 52. (a) | 53. (a) | 54. (a) | 55. (c) | 56. (b) | 57. (a) | 58. (b) | 59. (d) | 60. (d) |
| 61. (a) | 62. (b) | 63. (a) | 64. (c) | 65. (b) | 66. (c) | 67. (a) | 68. (a) | 69. (a) | 70. (d) |
| 71. (b) | 72. (a) | 73. (c) | 74. (a) | 75. (b) | 76. (a) | 77. (a) | 78. (a) | 79. (a) | 80. (c) |
| 81. (c) | 82. (a) | 83. (a) | 84. (b) | 85. (d) | 86. (b) | 87. (a) | 88. (b) | 89. (d) | 90. (d) |

# Sample Paper-I

- Which of the following event occurs during  $G_1$ -phase?
  - DNA replication
  - Growth and normal function of cell
  - Mutation
  - Fertilization
- The stage during which, cell decides to get specialized
  - S-phase
  - M-phase
  - $G_1$ -phase
  - $G_2$ -phase
- In which of the following wavelength, photo system-I is inactive?
  - 780 nm
  - 680 nm
  - 690 nm
  - 550 nm
- ADH deficiency causes
  - diabetes insipidus
  - goitre
  - tetany
  - acromegaly
- Law of limiting factor of photosynthesis was proposed by
  - von Mayer
  - Arnon
  - F F Blackmann
  - Hill
- Opening of stomata is not affected by
  - $N_2$
  - $K^+$  ions
  - Starch
  - None of these
- The IV cranial nerve is
  - oculomotor
  - trochlear
  - olfactory
  - facial
- Subunits of 80S ribosome are
  - 40S
  - 60S
  - Both (a) and (b)
  - None of these
- The stored food in animals is called
  - cellulose
  - starch
  - glucose
  - glycogen
- The cellular respiration first takes place in the
  - cytoplasm
  - Golgi bodies
  - ER
  - lysosomes
- Which of the following substrate is used in the formation of alcohol?
  - Sucrose
  - Glucose
  - Galactose
  - Fructose
- Rubisco stands for
  - Ribulose biphosphate carboxylase oxygenase
  - Ribulose phosphate carboxylase oxygenase



- (c) Ribulose phosphate carboxylic oxygenase  
(d) None of the above
13. Net gain of ATP molecules per hexose during aerobic respiration is  
(a) 12 (b) 18  
(c) 36 (d) 30
14. The term “hot dilute soup” was used by  
(a) Haldane (b) von Helmont  
(c) Redi (d) Louis Pasteur
15. Which of the following classification is based on some morphological characters?  
(a) Artificial (b) Natural  
(c) Phylogenetic (d) Both (b) and (c)
16. Sweet potato and potato are examples of  
(a) Homologous structure (b) Analogous structure  
(c) Both (a) and (b) (d) None of the above
17. ‘Systema Naturae’ was written by  
(a) Hutchinson (b) Lamarck  
(c) Linnaeus (d) Bentham and Hooker
18. In the origin of life, microspheres are most primitive protobiont, which have a membrane of  
(a) lipid and proteins (b) lipid  
(c) carbohydrates (d) fats
19. Rabies is caused by  
(a) Virus (b) Bacteria  
(c) Protozoa (d) All of these
20. Tuberculosis is caused by  
(a) *Vibrio cholerae* (b) *Mycobacterium*  
(c) *Salmonella typhi* (d) None of these
21. Which of the following provides nutrition to sperm?  
(a) Leydig cells (b) Scrotum  
(c) Sertoli cells (d) Epididymis
22. Oral contraceptive pills function by  
(a) Fertilization (b) Inhibiting ovulation  
(c) Reproduction (d) None of the above
23. *Sphagnum* belongs to  
(a) Bryophyta (b) Pteridophyta  
(c) Gymnosperm (d) Angiosperm
24. Fungi differs from slime moulds by lacking of  
(a) Flagellated spores (b) Ascospores  
(c) basidiospores (d) zygospores
25. Fungi are classified on the basis of  
(a) Sexual reproduction (b) Asexual reproduction  
(c) Vegetative reproduction (d) None of the above
26. Which one of the following does not belong to kingdom–Monera?  
(a) Mycoplasma (b) Archaeobacteria  
(c) Slime mould (d) Eubacteria

27. Which one of the following is not a plastid?  
(a) Mitoplast (b) Chromoplast  
(c) Chloroplast (d) Leucoplast
28. In retroviruses, RNA dependent DNA polymerase synthesizes  
(a) RNA–DNA (b) DNA  
(c) RNA (d) None of these
29. What will happen, when glucose is administered orally?  
(a) Excretion (b) Digestion  
(c) Circulation (d) Respiration
30. Agrose is a gel, which is used to separate  
(a) carbohydrate (b) fats  
(c) Both (a) and (b) (d) protein
31. The process of reverse transcription was discovered by  
(a) Temin and Baltimore (b) Watson and Crick  
(c) Alfred Hershey (d) None of the above
32. Which one of the following animal has pseudocoelome?  
(a) Cockroach (b) *Ancylostoma*  
(c) Aurelia (d) *Fasciola*
33. The process of joining of amino acids is called  
(a) Transcription (b) Translation  
(c) Conjugation (d) None of these
34. The infective stage of *Plasmodium vivax* is  
(a) sporozoite (b) gametocyte  
(c) trophozoite (d) cryptozoite
35. Which of the following is obtained from genetic engineering?  
(a) Haemoglobin (b) Glucose  
(c) Golden rice (d) None of these
36. Which of the following is a test cross?  
(a)  $Ww \times ww$  (b)  $WW \times ww$   
(c)  $Ww \times Ww$  (d)  $ww \times ww$
37. One gene–one enzyme hypothesis was propounded by  
(a) Beadle and Tatum (b) Louis Pasteur  
(c) J B S Haldane (d) None of the above
38. The glenoid cavity is associated with  
(a) scapula (b) humerus  
(c) Both (a) and (b) (d) None of these
39. The nerve fibre in its resting stage is  
(a) More- permeable to  $K^+$  (b) Semi-permeable to  $K^+$   
(c) Less permeable to  $K^+$  (d) All of the above
40. Genes when close together on a chromosome are known as  
(a) Linkage (b) Mutation  
(c) Translation (d) Transcription
41. In human beings, 45 chromosomes/single X/XO abnormality causes  
(a) Down's syndrome (b) Klinefelter's syndrome  
(c) Turner's syndrome (d) Edward's syndrome

42. An evolutionary process, giving rise to new species adapting to new habitats and ways of life is called  
(a) adaptive radiation (b) adaptation  
(c) convergent evolution (d) microevolution
43. The chromosomal arrangement results in  
(a) euploidy (b) aneuploidy  
(c) duplication (d) polyploidy
44. One of these is associated with terminator codon?  
(a) AGG (b) UAA  
(c) UUA (d) AUG
45. The inherent maximum capacity of an organism to reproduce or increase in number is called as  
(a) biotic potential (b) ecosystem  
(c) population (d) ecology
46. Which of the following is best suited for co-dominance?  
(a) Both are recessive (b) Both are dominance  
(c) One is recessive (d) One is dominance
47. The substance which is metal ion for the normal functioning of enzyme is called  
(a) cofactor (b) coenzyme  
(c) holoenzyme (d) None of these
48. Scala Naturae was written by  
(a) Linnaeus (b) Darwin  
(c) Aristotle (d) Whittaker
49. The gene which masks the effect of another gene is called  
(a) Epistasis (b) Lethal gene  
(c) Multiple allele (d) Complementary gene
50. In a DNA molecule, the adenine is 15%. What will be the percentage of guanine in this DNA?  
(a) 15% (b) 35%  
(c) 70% (d) 30%
51. Which one is used in the production of insulin by genetic engineering?  
(a) *Eschereria coli* (b) *Mycobacterium*  
(c) Both (a) and (b) (d) None of these
52. The synthesis of complex molecules from simple molecules was proved by  
(a) Arrhenius (b) Pasteur  
(c) Stanley Miller (d) Redi
53. Which is not correct according to Chargaff's rule?  
(a)  $A + T = C + G$  (b)  $A + G = C + T$   
(c)  $\frac{A + G}{C + T} = 1$  (d) None of these
54. Which of the following cells are associated with identification of colours in bright light?  
(a) Rod cells (b) Cone cells  
(c) Both (a) and (b) (d) None of these
55. Which of the following defines Hardey Weinberg's law?  
(a)  $p^2 + 2pq + q^2 = 1$  (b)  $p^2 + 2pq + q^2 = 1$   
(c)  $p^2 + 2pq + q^2 = 0$  (d)  $q^2 + p^2 + 2pq = 0$

56. Photochemical smog pollution does not contain  
(a) ozone (b) nitrogen dioxide  
(c) carbon dioxide (d) PAN
57. Decrease in the calcium level in blood is caused by  
(a) prolactin (b) calcitonin  
(c) adrenocorticotropin (d) oxytocin
58. The ozone layer is found in  
(a) troposphere (b) mesosphere  
(c) stratosphere (d) atmosphere
59. The pectoral fins get enlarged in  
(a) *Exocoetus* (b) *Scoliodon*  
(c) *Hippocampus* (d) *Coccosteus*
60. What is a keystone species?  
(a) A species which adds upto only a small proportion of the total biomass of a community, yet has a huge impact on the community's organization and survival.  
(b) A common species that has plenty of biomass, yet has a fairly low impact on the community's organization.  
(c) A rare species that has minimal impact on the biomass and on other species in the community.  
(d) A dominant species that constitutes a large proportion of the biomass and which affects many other species.
61. Which one of the following plant functions as symbiotic nitrogen fixing plant?  
(a) *Azolla* (b) *Cycas*  
(c) Moss (d) *Marchantia*
62. Bowman's glands are found in  
(a) olfactory epithelium (b) external auditory canal  
(c) cortical nephrons only (d) juxta medullary nephrons
63. An important evidence in favour of organic evolution is the occurrence  
(a) Homologous and vestigial organs (b) Analogous and vestigial organs  
(c) Homologous organs only (d) Homologous and analogous organs
64. Eutrophication is the result of  
(a) Bryophyte (b) Algae and aquatic plants  
(c) Gymnosperm (d) Pteridophyte
65. Which one of the following is non-biodegradable?  
(a) Sewage (b) DDT  
(c) Live stock waste (d) Market garbage
66. ADH controls water permeability of  
(a) Distal convoluted tubule (b) Proximal convoluted tubule  
(c) Bowman's capsule (d) All of the above
67. The cause of decline in the population of reptiles and birds is  
(a) DDT (b) bio-fertilizer  
(c) bio-insecticides (d) biodegradable
68. Which one of the following shows detritus food chain?  
(a) Organic waste → Bacteria → Mollusc (b) Grass → Insects → Snakes  
(c) Plankton → Small fishes → Large fishes (d) All of the above

69. Which of the following enzyme helps in digesting protein in stomach?  
(a) Trypsin (b) Pepsin  
(c) Ptyalin (d) Rennin
70. The Leydig cells secrete  
(a) estrogen (b) testosterone  
(c) progesterone (d) cortisol
71. Which one of the following is not a bio-fertilizer?  
(a) *Bacillus thuringiensis* (b) *Azotobacter*  
(c) *Azolla* (d) *Clostridium*
72. In India hot spot area is found in  
(a) Western Himalaya (b) Tropical Andes  
(c) Madagascar (d) Mesoamerica
73. The thaloid body of a slime mould (*Myxomycetes*) is known as  
(a) Protonema (b) Plasmodium  
(c) Fruiting body (d) Mycelium
74. A normal woman whose father was a colour blind person is married to a normal man. Her sons would likely to be  
(a) 75% colour-blind (b) 50% colour-blind  
(c) All normal (d) All colour-blind
75. Which of the following is not a function of liver?  
(a) Production of bile (b) Production of insulin  
(c) Glycogen storage (d) Detoxification
76. The vital capacity of human lung is equal to  
(a) 500 mL (b) 4600 mL  
(c) 5800 mL (d) 2300 mL
77. Wavelength of visible light/PAR is  
(a) 200-400 nm (b) 700-900 nm  
(c) 400-700 nm (d) 100-200 nm
78. DNA can be formed by  
(a) transaminase (b) lyases  
(c) RNA dependent DNA polymerase (d) All of the above
79. A cell active in protein synthesis will rich in  
(a) ribosomes (b) Golgi bodies  
(c) mitochondria (d) lysosomes
80. The RNA primer is used in  
(a) Translation (b) Replication  
(c) Conjugation (d) Transformation
81. Which part is edible in Jack fruit.  
(a) Bracts (b) Seeds  
(c) Perianth (d) All of these
82. Bands generally used for plant karyotyping.  
(a) Q and C band (b) Q and R band  
(c) G and C band (d) N and C band
83. Example of non competitive inhibition  
(a) G-6-P /Hexokinase (b) Sulpha drugs and /P- amino benzoic acid.  
(c) Cytochrome oxidase/Cyanide (d) All of these

84. Example of inhibitory gene from below options  
 (a) Fruit shape in Squash (b) Coat color in mouse.  
 (c) Fruit color in squash (d) Feather color in Fowls
85. Failure of chloride ion transport mechanism is seen in  
 (a) PKU (b) Cystic fibrosis  
 (c) Huntigton's disease (d) Sickle cell anemia
86. Match the column
- | <b>Antibiotic</b>  | <b>Effect</b>                                      |
|--------------------|----------------------------------------------------|
| A. Tetracycline    | (i) Inhibits translocation of m RNA along ribosome |
| B. Chloramphenicol | (ii) Inhibit interaction between tRNA and m-RNA    |
| C. Erythromycin    | (iii) Inhibit binding amino-acyl tRNA to ribosome  |
| D. Neomycin        | (iv) Inhibit peptidyl transferase                  |
- (a) A – i, B – ii, C – iii, D – iv (b) A – iii, B – iv, C – i, D – ii  
 (c) A – ii, B – iii, C – iii, D – i (d) A – iv, B – i, C – ii, D – iii
87. Which of the foolowoing products now a days prepared by recombinant DNA  
 (a) Erythropoietin (b) Interferons  
 (c) Interleukins (d) All of these
88. In which plant terminal leaflets are modified into curved hooks for helping the plant in climbing  
 (a) Argemone (b) Opuntia  
 (c) Bignonia unguis-cati (d) Ficus
89. Part edible in cutard Apple is  
 (a) Mesocarp (b) Pericarp  
 (c) Placental hairs (d) Fleshy thalamus
- 90.
- |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| G | ↓ | G | A | T | C | C |   |
| C |   | C | T | A | G | ↑ | G |
- Above diagram represent recognition site for  
 (a) Sca I (b) Sma I  
 (c) EcoRI (d) BamH I

### Answer Keys

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (b)  | 2. (c)  | 3. (a)  | 4. (a)  | 5. (c)  | 6. (a)  | 7. (b)  | 8. (c)  | 9. (d)  | 10. (a) |
| 11. (a) | 12. (a) | 13. (c) | 14. (a) | 15. (a) | 16. (b) | 17. (c) | 18. (a) | 19. (a) | 20. (b) |
| 21. (c) | 22. (b) | 23. (a) | 24. (a) | 25. (a) | 26. (c) | 27. (a) | 28. (a) | 29. (d) | 30. (d) |
| 31. (a) | 32. (b) | 33. (b) | 34. (a) | 35. (c) | 36. (a) | 37. (a) | 38. (c) | 39. (a) | 40. (a) |
| 41. (c) | 42. (a) | 43. (b) | 44. (b) | 45. (a) | 46. (b) | 47. (a) | 48. (c) | 49. (a) | 50. (b) |
| 51. (a) | 52. (c) | 53. (a) | 54. (b) | 55. (a) | 56. (c) | 57. (b) | 58. (c) | 59. (a) | 60. (a) |
| 61. (a) | 62. (a) | 63. (a) | 64. (b) | 65. (b) | 66. (a) | 67. (a) | 68. (a) | 69. (b) | 70. (b) |
| 71. (a) | 72. (a) | 73. (b) | 74. (b) | 75. (b) | 76. (b) | 77. (c) | 78. (c) | 79. (a) | 80. (b) |
| 81. (d) | 82. (d) | 83. (c) | 84. (d) | 85. (b) | 86. (b) | 87. (d) | 88. (c) | 89. (b) | 90. (b) |

*This page is intentionally left blank.*

# Sample Paper-II

1. An example for symbiotic bacteria
  - (a) *Erwinia amylovora*
  - (b) *Rhizobium leguminosarum*
  - (c) *Xanthomonas campestris*
  - (d) *Agrobacterium tumefaciens*
2. In which plant, the fruit is a drupe, seed coat is thin, embryo is inconspicuous and endosperm is edible?
  - (a) Groundnut
  - (b) Wheat
  - (c) Apple
  - (d) Coconut
3. Somaclonal variation appears in plants:
  - (a) Growing in polluted soil or water
  - (b) Exposed to gamma rays
  - (c) Raised in tissue culture
  - (d) Transformed by recombinant DNA technology
4. In a monoecious plant:
  - (a) Male and female sex organs are on different individuals
  - (b) Male and female gametes are of two morphologically distinct types
  - (c) Male and female sex organs are on the same individual
  - (d) All the stamens are fused to form one unit
5. Which one of the following are intracellular obligate parasites?
  - (a) Bacteria
  - (b) Viruses
  - (c) Slime moulds
  - (d) Blue-green algae
6. Pineapple fruit develops from:
  - (a) Unilocular polycarpellary flower
  - (b) Multipistillate syncarpus flower
  - (c) Multilocular monocarpellary flower
  - (d) A cluster of compactly born flowers on an axis
7. A sewage treatment process in which a part of decomposer bacteria present in the waste is recycled into the starting of the process is called:
  - (a) Cyclic treatment
  - (b) Activated sludge treatment
  - (c) Primary treatment
  - (d) Tertiary treatment
8. Which of following mineral-nutrients plays an important role in biological nitrogen fixation?
  - (a) Zinc
  - (b) Iron
  - (c) Molybdenum
  - (d) Magnesium
9. Which of the following is true?
  - (a) Vessels are unicellular and with narrow lumen
  - (b) Vessels are multicellular and with wide lumen
  - (c) Tracheids are unicellular and with wide lumen
  - (d) Tracheids are multicellular and with narrow lumen



10. In  $C_4$  plants, the bundle sheath cells:
  - (a) Have thin walls to facilitate gaseous exchange
  - (b) Have large intercellular spaces
  - (c) Are rich in PEP carboxylase
  - (d) Have a high density of chloroplasts
11. Potato spindle tuber disease is caused by:
  - (a) A nematode
  - (b) A virus
  - (c) A bacterium
  - (d) A viroid
12. In which of the following, all listed genera belong to the same class of algae?
  - (a) Chara, Fucus, Polysiphonia
  - (b) Volvox, Spirogyra, Chlamydomonas
  - (c) Porphyra, Ectocarpus, Ulothrix
  - (d) Sargassum, Laminaria, Gracillaria
13. In root nodules of legumes, leg-haemoglobin is important because:
  - (a) It transports oxygen to the root nodule
  - (b) It acts as an oxygen scavenger
  - (c) It provides energy to the nitrogen fixing bacterium
  - (d) It acts as a catalyst in transamination
14. Darwin judged the fitness of an individual by:
  - (a) Ability to defend itself
  - (b) Strategy to obtain food
  - (c) Number of offsprings
  - (d) Dominance over other individuals
15. Etiolation in plants is caused when:
  - (a) They are grown in dark
  - (b) They have mineral deficiency
  - (c) They are grown in intense light
  - (d) They are grown in blue light
16. Calorie is the unit of:
  - (a) Sound
  - (b) Temperature
  - (c) Light
  - (d) Heat
17. In an annual ring, the light coloured part is known as:
  - (a) Early wood
  - (b) Late wood
  - (c) Heartwood
  - (d) Sapwood
18. The chief component of the middle lamella in plant cell is:
  - (a) Potassium
  - (b) Calcium
  - (c) Magnesium
  - (d) Phosphorus
19. Tonoplast is a membrane surrounding the:
  - (a) Cytoplasm
  - (b) Vacuole
  - (c) Nucleus
  - (d) Mitochondria
20. Polyploidy can be produced artificially by:
  - (a) Colchicine
  - (b) Inbreeding
  - (c) Line breeding
  - (d) Self pollination
21. Recombination is involved in the process of:
  - (a) Cytokinesis
  - (b) Spindle formation
  - (c) Crossing over
  - (d) Chromosome duplication
22. A fibrous root system is excellent for:
  - (a) Food storage
  - (b) Nitrogen fixation
  - (c) Absorbing water from deeper layer of soil
  - (d) Providing good anchorage for the plant

23. If a primary root continues to grow, the type of root system will be known as:  
(a) Secondary (b) Fibrous  
(c) Tap (d) Stilt
24. A horizontal underground stem is a:  
(a) Corm (b) Phylloclade  
(c) Rhizome (d) Rhizoid
25. If global warming continues, the organism which may face more severe threat is:  
(a) Cow (b) Banana  
(c) Snow leopard (d) Dolphin
26. One advantage of cleistogamy is:  
(a) It leads to greater genetic diversity  
(b) Seed dispersal is more efficient and widespread  
(c) Seed set is not dependent on pollinators  
(d) Each visit of a pollinator results in transfer of hundreds of pollen grains
27. Jute fibres are obtained from the:  
(a) Secondary phloem (b) Pith  
(c) Xylem (d) Endodermis
28. A chromosome in which the centromere is situated close to its end so that one arm is very short and the other very long is:  
(a) Acrocentric (b) Metacentric  
(c) Sub-metacentric (d) Telocentric
29. Resin and turpentine are products of:  
(a) Teak (b) Oak  
(c) Eucalyptus (d) Pine
30. An inexhaustible non-conventional universal source of energy is:  
(a) Wind energy (b) Solar energy  
(c) Hydrothermal energy (d) Tidal energy
31. Which one of the following periods is largely associated with extinction of dinosaurs and the increase in flowering plants and reptiles?  
(a) Jurassic (b) Triassic  
(c) Cretaceous (d) Permian
32. Which type of water is used by the plants?  
(a) Gravitational water (b) Capillary water  
(c) Hygroscopic water (d) Bound water
33. Electroporation involves:  
(a) Promotion of seed germination by induced imbibition of water with electric current  
(b) Making transient pores in cell membrane to facilitate entry of gene constructs  
(c) Purification of saline water with the help of an artificial membrane  
(d) Passage of sucrose through sieve pores by electro-osmosis
34. One of the following acts as secondary pollutant:  
(a) Br<sub>2</sub> (b) Cl<sub>2</sub>  
(c) NO<sub>2</sub> (d) HNO<sub>3</sub>
35. Cuticle is absent in:  
(a) Mesophytes (b) Young roots  
(c) Mature stems (d) Leaves

36. The least porous soil among the following is a:
- (a) Loamy soil (b) Silty soil  
(c) Clayey soil (d) Peaty soil
37. In higher plants, the shape of the chloroplast is:
- (a) Discoid (b) Cup-shaped  
(c) Girdle-shaped (d) Reticulate
38. Which of the following statements is false?
- (a) TMV has a double-stranded RNA molecule  
(b) Most plant viruses are RNA viruses  
(c) The bacteriophage has a double-stranded DNA molecule  
(d) Most animal viruses are DNA viruses
39. A kingdom common to unicellular animals and plants is:
- (a) Monera (b) Plantae  
(c) Fungi (d) Protista
40. Which of the following is a rootless aquatic plant, in which a portion of the leaf forms a tiny sac for trapping insects?
- (a) Nepenthes (b) Drosera  
(c) Utricularia (d) Dionaea
41. Enzymes that catalyse inter-conversion of optical, geometrical or positional isomers are:
- (a) Ligases (b) Lyases  
(c) Hydrolases (d) Isomerases
42. According to abiogenesis life originate from:
- (a) Non-living (b) Pre-existing life  
(c) Chemicals (d) Extra-terrestrial matter
43. External fertilization occurs in majority of:
- (a) Algae (b) Fungi  
(c) Liverworts (d) Mosses
44. The final stable community in ecological succession is:
- (a) Pioneers (b) Sere  
(c) Climax (d) carnivores
45. Which of the following combinations of characters is true for slime moulds?
- (a) Parasitic, plasmodium with true walls, spores dispersed by air currents  
(b) Saprophytic, plasmodium without walls, spores dispersed by water  
(c) Parasitic, plasmodium without walls, spores dispersed by water  
(d) Saprophytic, plasmodium without walls, spores dispersed by air currents
46. Which is an organic compound found in most cells?
- (a) Glucose (b) Water  
(c) Sodium chloride (d) Oxygen
47. Taxonomic hierarchy refers to:
- (a) Stepwise arrangement of all categories for classification of plants and animals  
(b) A group of senior taxonomists who decide the nomenclature of plants and animals  
(c) A list of botanists or zoologists who have worked on taxonomy of a species or group  
(d) Classification of a species based on fossil record

48. Reproductive isolation between segments of a single population is termed:  
(a) Sympatry (b) Allopatry  
(c) Population divergence (d) Disruptive divergence
49. Steroid hormones easily pass through the plasma membrane by simple diffusion because they:  
(a) Are water soluble (b) Contain carbon and hydrogen  
(c) Enter through pores (d) Are lipid soluble
50. Industrial melanism is an example of:  
(a) Defensive adaptation of skin against UV radiations  
(b) Drug resistance  
(c) Protective resemblance with the surrounding  
(d) Darkening of skin due to industries
51. The larva of *Bombyx mori* is known as:  
(a) Nymph (b) Trochophore  
(c) Cocoon (d) Caterpillar
52. Which of the following is a viviparous fish?  
(a) Exocoetus (b) Gambusia  
(c) Clarias (d) Labeo
53. The cutaneous plexus and the papillary plexus consist of:  
(a) A network of nerves to provide dermal sensation  
(b) A network of arteries to provide derma supply  
(c) Specialized cells for cutaneous sensations  
(d) Gland cells that release cutaneous secretions
54. The function of vagus nerve innervating the heart is to:  
(a) Initiate the heart beat (b) Reduce the heart beat  
(c) Accelerate the heart beat (d) Maintain constant heart beat
55. The size of pupil is controlled by the:  
(a) Ciliary muscles (b) Suspensory ligaments  
(c) Cornea (d) Iris muscles
56. Largest single mass of lymphatic tissue in the body is:  
(a) Lung (b) Spleen  
(c) Liver (d) Kidney
57. HIV is classified as a retrovirus because its genetic information is carried in:  
(a) DNA instead of RNA (b) DNA  
(c) RNA instead of DNA (d) Protein coat
58. Vomiting centre is located in the:  
(a) Stomach and sometimes in duodenum (b) Gastro-intestinal tract  
(c) Hypothalamus (d) Medulla oblongata
59. Sickle cell anaemia is:  
(a) Autosomal dominant inheritance (b) X-linked recessive inheritance  
(c) Autosomal recessive inheritance (d) X-linked dominant inheritance
60. Skeletal muscles are controlled by:  
(a) Sympathetic nerves (b) Parasympathetic nerves  
(c) Somatic nerves (d) Autonomic nerves

61. Niche is defined as the:
- (a) Position of species in a community in relation to other species
  - (b) Place where organism lives
  - (c) Place where organism lives and performs its duty
  - (d) Place where population perform their duties
62. Erythropoiesis starts in:
- (a) Kidney
  - (b) Liver
  - (c) Spleen
  - (d) Red bone marrow
63. In an aquatic ecosystem, the trophic level equivalent to cows in grasslands is:
- (a) Phytoplankton
  - (b) Zooplankton
  - (c) Nekton
  - (d) Benthos
64. Oxidative phosphorylation refers to:
- (a) Anaerobic production of ATP
  - (b) The citric acid cycle production of ATP
  - (c) Production of ATP by chemiosmosis
  - (d) Alcoholic fermentation
65. Down's syndrome is due to:
- (a) Linkage
  - (b) Sex-linked inheritance
  - (c) Crossing over
  - (d) Non-disjunction of chromosome
66. All flat worms differ from all round worms in having:
- (a) Triploblastic body
  - (b) Solid mesoderm
  - (c) Bilateral symmetry
  - (d) Metamorphosis in the life history
67. Deserts, grasslands, forests and tundra are the examples of:
- (a) Biomes
  - (b) Biogeographical regions
  - (c) Ecosystems
  - (d) Biospheres
68. Which of the following is a free living nitrogen fixing bacterium present in the soil?
- (a) *Nitrosomonas*
  - (b) *Rhizobium*
  - (c) *Azotobacter*
  - (d) *Pseudomonas*
69. *Aedes aegypti* is a vector for:
- (a) Both dengue and yellow fever
  - (b) Dengue fever
  - (c) Yellow fever
  - (d) Japanese encephalitis
70. Inadequate protein intake leads to kwashiorkor. The subsequent edema is most closely related to inadequate synthesis of which protein?
- (a) Gamma globulin
  - (b) Glucagon
  - (c) Insulin
  - (d) Albumin
71. The "lock and key" model of enzyme action illustrates that a particular enzyme molecule:
- (a) May be destroyed and resynthesised several times
  - (b) Interacts with a specific type of substrate molecule
  - (c) Reacts at identical rates under all conditions
  - (d) Forms a permanent enzyme-substrate complex
72. If the pituitary gland of an adult rat is surgically removed, which of the following endocrine glands will be less affected?
- (a) Adrenal cortex
  - (b) Adrenal Medulla
  - (c) Thyroid
  - (d) Gonads

73. If one litre of water is introduced in human blood, then:
- (a) BMR increases
  - (b) RBC collapses and urine production increases
  - (c) RBC collapses and urine production decreases
  - (d) BMR decreases
74. Beadle and Tatum showed that each kind of mutant bread mould they studied lacked a specific enzyme. Their experiments demonstrated that:
- (a) Cells need specific enzymes in order to function
  - (b) Genes are made of DNA
  - (c) Enzymes are required to repair damage
  - (d) Genes carry information for making proteins
75. mRNA directs the building of proteins through a sequence of:
- (a) Exons
  - (b) Introns
  - (c) Codons
  - (d) Anticodons
76. Carbon dioxide is called green-house gas because it is:
- (a) Used in green-house to increase plant growth
  - (b) Transparent to heat but traps sunlight
  - (c) Transparent to sunlight but traps heat
  - (d) Transparent to both sunlight and heat
77. The hormone that increases the blood calcium level and decreases its excretion by kidney is:
- (a) Parathormone
  - (b) Calcitonin
  - (c) Thyroxine
  - (d) Insulin
78. Signaling between cells usually results in the activation of protein:
- (a) Lipases
  - (b) Kinases
  - (c) Proteases
  - (d) Nucleases
79. Estrogen and testosterone are steroid hormones, and are most likely to bind to:
- (a) Membrane ion channels
  - (b) Enzyme-linked membrane receptors
  - (c) G-protein linked membrane receptors
  - (d) Cytoplasmic receptors
80. Which of the following is unique to mitosis and not a part of meiosis?
- (a) Homologous chromosomes behave independently
  - (b) Chromatids are separated during anaphase
  - (c) Homologous chromosomes pair and form bivalents
  - (d) Homologous chromosomes crossover
81. Transplant between different species is
- (a) Isograft
  - (b) Allograft
  - (c) Xenograft
  - (d) None of these
82. The UN conference of Parties on climate change in the year 2016 was held at
- (a) Warsaw
  - (b) Lima
  - (c) Marrakech
  - (d) Paris
83. Uses of organisms to add essential materials to a degraded ecosystem
- (a) Bio-deterioration
  - (b) Bio-augmentation
  - (c) Bio-transformation
  - (d) Bio-magnification

84. ABA can be bioassayed by  
 (a) Triple pea test  
 (b) Root inhibition test  
 (c) Inhibition of  $\alpha$ - amylase synthesis in barley endosperm test  
 (d) Tobacco pith culture
85. Polytene chromosome first reported by  
 (a) Kollar (b) Balbiani  
 (c) Flemming (d) Ruckert
86. What happens when sperm enters in secondary oocyte in humans  
 (a) Breaking of MPF (b) Turning of APC  
 (c) Both of above (d) None of the above
87. The science of ageing is referred as  
 (a) Anthropology (b) Chronology  
 (c) Gerontology (d) Ctetology
88. The extent of which ion accumulation in guard cells determines the size of the stomatal opening  
 (a) sodium ion (b) Potassium ion  
 (c) Chloride ion (d) Calcium ion
89. Nodule formation in leguminous plant believed to be occur due to  
 (i) Cytokinin produced by invading bacteria  
 (ii) Auxin produced by plant cell.  
 (iii) Auxin produced by invading bacteria  
 (iv) Cytokinin produced by plant cell.  
 (a) (i) and (ii) only (b) (i) and (iii) only  
 (c) (iii) and (iv) only (d) (ii) and (iv) only
90. Hydroxypyruvate in C-2 cycle formed in which cell organelle  
 (a) Chloroplast (b) Mitochondria  
 (c) Peroxisome (d) Vacoule

### *Answer Keys*

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (b)  | 2. (d)  | 3. (c)  | 4. (c)  | 5. (b)  | 6. (d)  | 7. (b)  | 8. (c)  | 9. (b)  | 10. (d) |
| 11. (d) | 12. (b) | 13. (b) | 14. (c) | 15. (a) | 16. (d) | 17. (a) | 18. (b) | 19. (b) | 20. (a) |
| 21. (c) | 22. (d) | 23. (c) | 24. (c) | 25. (c) | 26. (c) | 27. (a) | 28. (a) | 29. (d) | 30. (b) |
| 31. (c) | 32. (b) | 33. (b) | 34. (d) | 35. (b) | 36. (c) | 37. (a) | 38. (a) | 39. (d) | 40. (c) |
| 41. (d) | 42. (a) | 43. (a) | 44. (c) | 45. (d) | 46. (a) | 47. (a) | 48. (a) | 49. (d) | 50. (c) |
| 51. (d) | 52. (b) | 53. (a) | 54. (b) | 55. (d) | 56. (b) | 57. (c) | 58. (d) | 59. (c) | 60. (c) |
| 61. (c) | 62. (b) | 63. (b) | 64. (c) | 65. (d) | 66. (b) | 67. (a) | 68. (c) | 69. (a) | 70. (d) |
| 71. (b) | 72. (b) | 73. (b) | 74. (d) | 75. (c) | 76. (c) | 77. (a) | 78. (b) | 79. (d) | 80. (a) |
| 81. (c) | 82. (c) | 83. (b) | 84. (c) | 85. (b) | 86. (c) | 87. (c) | 88. (b) | 89. (a) | 90. (c) |

# Sample Paper-III

- How many genes are found in *Drosophila Melanogaster*?
  - 30,000
  - 18,000
  - 13,000
  - 4,000
- Which enzyme is responsible for degrading cell wall?
  - Hexokinase
  - Amylase
  - Glukcokinase
  - Cellulase
- Enzyme found functional in lysosome is:
  - Acid phosphatase
  - Basic phosphatase
  - Oxido reductase
  - Liases
- Action of lysozyme is:
  - Physiological
  - Anatomical
  - Morphological
  - None of these
- Which is not phagocytic?
  - Monocyte
  - Lymphocyte
  - Mast-cell
  - Neutrophil
- Which part of brain control intellectual ability?
  - Frontal lobe
  - Parietal lobe
  - Temporal lobe
  - Occipital lobe
- The correct sequence of meanings of brain from outside to inside is:
  - Duramater → arachnoid → piamater
  - Arachnoid → duramater → piamater
  - Piamater → duramater → arachnoid
  - Duramater → piamater → arachnoid
- The sequence of ear ossicles from outside to inside is:
  - Malleus → Incus → Stapes
  - Incus → Stapes → Malleus
  - Stapes → Incus → Malleus
  - Malleus → Stapes → Incus
- Which of the following is balancing organ?
  - Organ of Corti
  - Cochlea
  - Vestibular region
  - All of these
- Glenoid cavity is found in:
  - Pelvic girdle
  - Pectoral girdle
  - Sternum
  - Humerus
- Vital capacity of lung is:
  - TV + IRV + ERV
  - TV + IRV + RV
  - TV + ERV
  - IRV + ERV
- During normal respiration without any effort the volume of air inspired or expired is called:
  - Tidal volume
  - Reserve volume
  - Residual volume
  - None of these



13. Synaptic vesicle is found in:  
(a) Pre synaptic neuron (b) Post synaptic neuron  
(c) Synaptic cleft (d) None of the above
14. 3-PGA is first stable product in  
(a) carbon-reduction cycle (b) OAA  
(c) Malic acid (d) PEP
15. Fat storing granules are:  
(a) Elaioplast (b) Amyloplast  
(c) Aleuroplast (d) None of these
16. Sub units in prokaryotic ribosomes are:  
(a) 60S – 40S (b) 50S – 30S  
(c) 40S – 30S (d) 50S – 20S
17. Adaptive radiation is for:  
(a) Dissimilar character for adoption from common ancestor  
(b) Similar characters for adoption from common ancestor  
(c) Dissimilar character for adoption from different ancestor  
(d) Similar characters for adoption from different ancestor
18. Competition of species leads to:  
(a) Extinction (b) Mutation  
(c) Greater number of niches are formed (d) Symbiosis
19. Large unit of land having different types of plants and animals:  
(a) Uniform vegetation (b) Biome  
(c) Ecosystem (d) Niche
20. Pepsinogen is secreted by:  
(a) Chief cell (b) Oxyntic cell  
(c) Mast cell (d) Parietal cell
21. Haematuria means:  
(a) RBC in the urine (b) WBC in the urine  
(c) Both (a) and (b) (d) None of the above
22. Which of the following is both osmoregulator as well as nitrogenous product?  
(a)  $\text{NH}_3$  (b) Urea  
(c) Uric acid (d) All of these
23. Phylogenetic system was given by:  
(a) Engler and Prantl (b) Pliny  
(c) John Ray (d) R.H. Whittaker
24. Coacervates are:  
(a) Protobionts having polysaccharide + protein +  $\text{H}_2\text{O}$   
(b) Protein aggregate  
(c) Protein and lipid aggregates  
(d) None of the above
25. Bt toxin obtained from:  
(a) Prokaryotes (b) Eukaryotes  
(c) Both (a) and (b) (d) None of these

26. Which is correct?  
(a) Slime moulds are haploid  
(b) Protozoan lack cell wall  
(c) Dinoflagellates are immotile  
(d) Pellicle is absent in *Euglena*
27. Zygospore is:  
(a) Give rise to zoospores on meiosis  
(b) Equivalent to Ascus, *Brasilia*  
(c) Dormant stage  
(d) Give raise to asexual spore
28. Which disaccharide has different linkage?  
(a) Maltose  
(b) Starch  
(c) Sucrose  
(d) Lactose
29. Corpus luteum secretes  
(a) Progesterone and estrogen  
(b) LH  
(c) Only progesterone  
(d) Progesterone and LH
30. Testosterone is secreted by  
(a) Leydig cell  
(b) Sertoli cell  
(c) Spermatogenic cell  
(d) All of the above
31. Hypothyroidism causes  
(a) Myxedema  
(b) Cretinism  
(c) Both (a) and (b)  
(d) Exophthalmic goiter
32. Which of the following controls the function of Sertoli cell?  
(a) FSH  
(b) Estrogen  
(c) ACTH  
(d) Testosterone
33. Fertilization of sperm and ova takes place in:  
(a) Ampulla of oviduct  
(b) Isthmus of oviduct  
(c) Fimbriae of oviduct  
(d) None of the above
34. Rr/rr progeny: Red (dominant) flowered heterozygous crossed with white flower:  
(a) 350 → red: 350 → white  
(b) 450 → red: 250 → white  
(c) 380 → red: 320 → white  
(d) None of the above
35. Linkage group in *E. coli* is/are:  
(a) 4  
(b) 2  
(c) 1  
(d) 5
36. Which of the following first suggest the conservative model of DNA replication?  
(a) Cairns  
(b) Meselson and Stahl  
(c) Watson and Crick  
(d) Taylor
37. Lactic acid is formed in:  
(a) Fermentation  
(b) Glycolysis  
(c) HMP pathways  
(d) None of these
38. Red list in India completed by:  
(a) Botanical survey of India  
(b) Zoological survey of India  
(c) Geological survey of India  
(d) None of the above
39. National Botanical Institute is situated at:  
(a) Lucknow  
(b) Kolkata  
(c) Mumbai  
(d) Chennai
40. Penicillin was used in:  
(a) I world war  
(b) II world war  
(c) Both (a) and (b)  
(d) None of these

41. Blindness prevented by use of which crop in poor country?  
(a) Golden rice (b) Wheat  
(c) Gram (d) Pea
42. Movement of  $H_2O$  through cell wall is:  
(a) Apoplast (b) Symplast  
(c) Tonoplast (d) None of these
43. In which of the following animals Hb is found dissolved in plasma?  
(a) Earthworm (b) Cockroach  
(c) Sepia (d) Planaria
44. RAAS secretes which of the following hormone?  
(a) Mineralo corticoids (b) Gluco corticoids  
(c) Both (a) and (b) (d) None of these
45. Bones become fragile in:  
(a) Osteoporosis (b) Gout  
(c) Arthritis (d) None of these
46. During repolarization of nerve:  
(a)  $K^+$  gate closed and  $Na^+$  gate open  
(b)  $Na^+$  channels are closed  $K^+$  channels are open  
(c) Both gates remain open  
(d) Both  $K^+$  and  $Na^+$  gates are closed
47. Zn, Mo, Fe, Cu are:  
(a) Trace element (b) Non-essential  
(c) Macro nutrient (d) None of these
48. Depict the correct site of hormone:  
(a)  $\alpha$ -glucagons,  $\beta$ -insulin,  $\delta$ -somatostatin  
(b)  $\alpha$ -insulin,  $\beta$ -glucagons,  $\delta$ -somatostatin  
(c)  $\delta$ -insulin,  $\alpha$ -somatostatin,  $\beta$ -glucagons  
(d)  $\alpha$ -somatostatin,  $\beta$ -insulin,  $\delta$ -glucagons
49. Insulin receptors are:  
(a) Extrinsic protein (b) Intrinsic protein  
(c) G-protein (d) Trimeric protein
50. Mode of feeding in free living protozoan is:  
(a) Holozoic (b) Saprozoic  
(c) Both (a) and (b) (d) None of these
51. Protein deficiency leads to:  
(a) Kwashiorkar (b) Marasmus  
(c) Cretinism (d) Both (a) & (b)
52. Chloride shift in respond to:  
(a)  $HCO_3^-$  (b)  $K^+$   
(c)  $H^+$  (d)  $Na^+$
53. Double fertilization involves:  
(a) Syngamy + triple fusion (b) Double fertilization  
(c) Development of antipodal cells (d) None of the above

54. Late blight of potato is caused by:  
(a) *Phytophthora infestans* (b) *Xanthomonas oryzae*  
(c) *Puccinia graminis* (d) TMV
55. Tendril of Cucurbita and thorns of *Bougainvillea* are:  
(a) Homologous organ (b) Analogous organ  
(c) Vestigial organ (d) None of these
56. O<sub>2</sub> dissociation curve is:  
(a) Sigmoid curve (b) Parabolic  
(c) Hyperbolic (d) Straight line
57. IAA is derived from or which of the following is involved in the synthesis of a plant hormone IAA and Vasoconstrictor Serotonin?  
(a) Tryptophan (b) Tyrosine  
(c) Phenylalanine (d) None of these
58. Transverse binary fission is found in:  
(a) *Paramecium* (b) *Amoeba*  
(c) *Hydra* (d) *Euglena*
59. Capacitation of sperm occurs in:  
(a) Female genital tract (b) Vas deferens  
(c) Vas efferens (d) Vagina
60. Phytoplankton's are found in which of the following zone?  
(a) Limnetic zone (b) Profundal zone  
(c) Littoral (d) Aphotic zone
61. Estuaries are considered of nutrient and trap:  
(a) River (b) Pond  
(c) Lake (d) Ocean
62. Green algae contains:  
(a) Chlorophyll (a) and (b) (b) Starch  
(c) Carotenoid (d) All of the above
63. Branch of biology dealing with study of organism in outer space is:  
(a) Exobiology (b) Ethology  
(c) Euphenics (d) Ethnology
64. Each immunoglobulin has two heavy chains and two light chains; the antigen binding is present in:  
(a) Variable region of heavy chain  
(b) Variable region of both heavy and light chain  
(c) Variable region of light chain  
(d) Constant region of both light and heavy chain
65. Extension of plasma membrane in prokaryotic cell is:  
(a) Mesosome (b) Hapnoid  
(c) Ribosome (d) None of these
66. Central dogma of genetic information modified by the discovery of:  
(a) Reverse transcriptase (b) DNA polymerase  
(c) RNA polymerase (d) Ligase

67. Incorrect character of brown algae is:  
(a) Chl a and b present (b) They remain attached  
(c) Chl a and c present (d) Presence of fucoxanthin
68. Digestive enzymes are:  
(a) Hydrolases (b) Oxido reductases  
(c) Transferases (d) Lyases
69. Protein found in eye lens is:  
(a) Crystalline (b) Collagen  
(c) Opsin (d) Rhodopsin
70. Which cell secretes antibody?  
(a) Lymphocytes (b) Monocytes  
(c) Eosinophil (d) Neutrophil
71. Turner syndrome is:  
(a) XO (b) XXY  
(c) XXX (d) XYY
72. Operon concept was proposed by:  
(a) Jacob and Monod (b) David Baltimore  
(c) Allec Jaffery (d) None of the above
73. Blood clotting vitamin is:  
(a) Vitamin-K (b) Vitamin-A  
(c) Vitamin-B<sub>12</sub> (d) Vitamin-B<sub>6</sub>
74. Expand ELISA:  
(a) Enzyme linked immunosorbent assay  
(b) Enzyme linked ion sorbent assay  
(c) Enzyme linked inductive assay  
(d) None of the above
75. Internodes elongation is due to:  
(a) Gibberellin (b) Auxin  
(c) Cytokinin (d) Abscisic acid
76. Apical dominance is due to:  
(a) Auxin (b) Cytokinin  
(c) Ethylene (d) Gibberellin
77. Gibberellin causes:  
(a) Apical dominance (b) Flowering  
(c) Internodal growth (d) Wilting
78. If non-limiting condition are provided then, which happens?  
(a) Natality increase and mortality decreases (b) Morality decrease  
(c) Natality increases (d) Motality increases
79. Mother 'B' homozygous, father 'A' unknown ∴ possible blood group in progeny is:  
(a) AB and B possible (b) AB and A possible  
(c) A + B possible (d) O possible
80. In flagella membrane which enzyme catalyses ATP activity?  
(a) Cytoplasmic dyenin (b) Dyenin  
(c) Kinesis (d) Myosin

81. Amphivasal vascular bundles are found in  
 (a) Fern (b) Cucurbita  
 (c) Dracaena (d) Luffa cylindrica
82. Certain endodermal cell which are present opposite to the xylem bundle remain thin walled, these cells are  
 (a) Bulliform cells (b) Passage cells  
 (c) Companion cells (d) Subsidiary cells
83. Example of holocrine gland is  
 (a) Pancrease (b) Mammary gland  
 (c) Salivary gland (d) Sebaceous gland
84. Haversian system is found in  
 (a) Bone (b) Blood  
 (c) Cartilage (d) Muscles
85. Who firmly establish Germ theory of disease  
 (a) Darwin (b) A. Weismann  
 (c) L. Pasteur (d) Cuvier
86. Who introduce term homologous  
 (a) Darwin (b) Lamarck  
 (c) Cuvier (d) Richard Owen
87. de Vries proposed mutation theory on the basis of his observation on the wild variety of which plant  
 (a) Pisum Sativum (b) Lathyrus odoratus  
 (c) Oenothera lamarckiana (d) Solanum tuberosum
88. Phenetics is  
 (a) Cytotaxonomy (b) Chemotaxonomy  
 (c) Numerical taxonomy (d) Classification
89. Most well known natural system of classification of angiosperm was proposed by  
 (a) Bentham and Hooker (b) Aristotle  
 (c) Schleiden and Schwann (d) Beadle and Tatum
90. Which of the following is known as Dead man's finger  
 (a) Potorion (b) Euplectella  
 (c) Chalina (d) Euspongia

### Answer Keys

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (b)  | 3. (a)  | 4. (a)  | 5. (b)  | 6. (a)  | 7. (a)  | 8. (a)  | 9. (c)  | 10. (b) |
| 11. (a) | 12. (a) | 13. (a) | 14. (a) | 15. (a) | 16. (b) | 17. (a) | 18. (a) | 19. (b) | 20. (a) |
| 21. (a) | 22. (b) | 23. (a) | 24. (a) | 25. (a) | 26. (b) | 27. (c) | 28. (c) | 29. (a) | 30. (a) |
| 31. (c) | 32. (a) | 33. (a) | 34. (a) | 35. (c) | 36. (b) | 37. (a) | 38. (a) | 39. (a) | 40. (b) |
| 41. (a) | 42. (a) | 43. (a) | 44. (a) | 45. (a) | 46. (b) | 47. (a) | 48. (a) | 49. (a) | 50. (a) |
| 51. (d) | 52. (a) | 53. (a) | 54. (a) | 55. (a) | 56. (a) | 57. (a) | 58. (a) | 59. (a) | 60. (c) |
| 61. (a) | 62. (d) | 63. (a) | 64. (b) | 65. (a) | 66. (a) | 67. (a) | 68. (a) | 69. (a) | 70. (a) |
| 71. (a) | 72. (a) | 73. (a) | 74. (a) | 75. (a) | 76. (a) | 77. (c) | 78. (a) | 79. (a) | 80. (b) |
| 81. (c) | 82. (b) | 83. (d) | 84. (a) | 85. (c) | 86. (d) | 87. (c) | 88. (c) | 89. (a) | 90. (c) |

*This page is intentionally left blank.*

*This page is intentionally left blank.*



