

# Biotechnology and its Application

### MULTIPLE CHOICE QUESTIONS

#### Topic 1

#### **Basis of Classification**

- **1.** Application like bioremediation, processed food, therapeutics and diagnostics are related to
  - (a) Biochemistry (b) Microbiology
  - (c) Biotechnology (d) Medical Science
- **2.** \_\_\_\_\_ is/are the critical research area(s) of biotechnology.
  - (a) Creating optimal conditions for catalyst to to function
  - (b) Providing the best catalyst
  - (c) Developing down streaming processing technique
  - (d) All of the above
- 3. Biotechnology mainly deals with
  - (a) Industrial scale production of biopharmaceuticals
  - (b) Biological use of genetically modified microbes, fungi, plants and animals
  - (c) Both (a) and (b)
  - (d) None of these
- **4.** Which of the following is not included in the applications of biotechnology?
  - (a) Waste treatment
  - (b) Conventional hybridisation
  - (c) Energy production
  - (d) Genetically modified crops

### TopicBiotechnological Applications2in Agriculture

5. A novel strategy was adopted to prevent *Meloidiogyne incognita* infection in tobacco plants that was based on the process of(a) DNA interference
(b) RNA interference

(c) RNA initiation (d) DNA initiation

#### 6. RNAi stand for

- (a) RNA inteferon (b) RNA interference
- (c) RNA inactivation (d) RNA initiation
- 7. RNAi takes place in all \_\_\_\_\_ organisms as a method of \_\_\_\_\_.
  - (a) prokaryotes, insect resistant
  - (b) eukaryotes, insect resistant
  - (c) eukaryotes, cellular defence
  - (d) prokaryotes, cellular defence
- 8. \_\_\_\_\_ is used for silencing of an unwanted gene. (a) RNA (b) DNA polymerase
  - (c) Restriction enzyme (d) All of these
- **9.** Silencing of mRNA molecule in order to control the production of a harmful protein has been used in the protection of plants from:
  - (a) Beetles (b) Armyworm
  - (c) Budworm (d) Nematodes
- 10. Transposons are also known as
  - (a) Silenced gene
  - (b) Plesotropic genes
  - (c) Mobile genetic elements
  - (d) Both (a) and (c)

- 11 Tobacco plant resistant to a nemotode have been developed by the introduction of DNA and it is produced in the host cells as
  - (a) a particular hormone
  - (b) toxic protein
  - (c) both sense and antisense RNA
  - (d) an antifeedant
- **12.** Which of the following options is not for increasing food production?
  - (a) Agro-chemical based agriculture
  - (b) Organic agriculture
  - (c) Genetic engineered crop-based agriculture
  - (d) None of these
- **13.** Organic agriculture is a technique of raising crops for
  - (a) increased food production
  - (b) reduction in required labour
  - (c) increasing the use of agro-chemicals
  - (d) Both (a) & (c)
- **14.** Use of genetically modified crops in crop field may
  - (a) reduce the harmful effects of fertilizers
  - (b) maximize yield
  - (c) be environment friendly
  - (d) All of the above
- **15.** Plants, bacteria, fungi and animals whose genes have been altered by manipulation are called
  - (a) Pest resistant organisms
  - (b) Hybrid organisms
  - (c) Genetically modified organisms
  - (d) Insect resistant organisms
- **16.** Golden rice is genetically modified crop plant with incorporated gene meant for biosynthesis of
  - (a) Vitamin E (b) Vitamin K
  - (c) Omega-3 (d) Vitamin A
- 17. \_\_\_\_\_ is produced by *Bacillus thuringiensis*.
  - (a) t-toxin (b) Bt toxin
  - (c) An acid (d) All of these

- **18.** The bacterium *Bacillus thuringiensis* produce \_\_\_\_\_ plants which reduces the amount of \_\_\_\_\_ used.
  - (a) disease resistant, insecticide
  - (b) insect resistant, fertilizers
  - (c) disease resistant, industrial enzyme
  - (d) insect resistant, insecticide
- **19.** Which of the following crops are modified using *Bacillus thuringiensis*?
  - (a) Corn and cotton
  - (b) Tomato and rice
  - (c) Potato and soyabean
  - (d) All of the above
- **20.** Which of the following is being grown in India by farmers as Bt crop?
  - (a) Maize (b) Brinzal
  - (c) Cotton (d) Soyabean
- **21.** By inserting a piece of DNA from \_\_\_\_\_, insect resistant transgenic cotton has been produced.
  - (a) a wild relative of cotton
  - (b) bacterium
  - (c) an insect
  - (d) virus
- **22.** Some strains of *Bacillus thuringiensis* produce proteins that kill insect like
  - (a) Lepidopterans (b) Coleopterans
  - (c) Dipterans (d) All of these
- 23. Coleopterans examples are/is-
  - (a) Flies (b) Mosquitoes
  - (c) Beetles (d) All of the above
- 24. *Bacillus thuringiensis* forms protein crystals which contain a-
  - (a) Simple protein
  - (b) Non-toxic insecticidal protein
  - (c) Toxic insecticidal protein
  - (d) Simple lipids
- **25.** Why does Bt toxin protein crystal not kill the *Bacillus*? Because-
  - (a) Bacteria encloses toxins in special sac
  - (b) Bacteria are resistant to toxin

- (c) Toxin occurs as inactive protoxins in bacteria
- (d) All of the above
- 26. Bt toxin kills insect by-
  - (a) Inhibiting protein synthesis
  - (b) Generating excessive heat
  - (c) Creating pores leading to cell swelling and lysis in the midgut epithelial cells
  - (d) None of these
- 27. The choice of genes of Bacillus thuringiensis, incorporated into the crop depends upon
  - (a) Crop (b) Targeted pest
  - (c) Both (a) and (b) (d) Toxin
- **28.** The crops having **cry** genes need
  - (a) Small amount of fungicide
  - (b) Large amount of pesticide
  - (c) Small amount of insecticide
  - (d) None of the above
- 29. The Bt toxin protein
  - (a) obstruct a biosynthetic pathway
  - (b) causes death of the insect
  - (c) stops egg laying of adult
  - (d) generate excessive heat
- **30.** Cotton bollworm is controlled by-
  - (a) Cry I Ac, Cry II Ab
  - (b) Cry I Ac, Cry II Ac, Cry I Ab
  - (c) Cry II Ac, Cry I Ab
  - (d) Cry I Ab
- **31.** Bt corn has been made resistant to corn borer by the introduction of gene-
  - (a) Cry I Ac (b) Cry II Ab (d) Crv II Ac
  - (c) Cry I Ab
- 32. Cry II Ab and Cry I Ab produces toxins that control
  - (a) Cotton bollworms and corn borer respectively.
  - (b) Cotton bollworm and budworms of tobacco respectively.
  - (c) Corn borer and cotton bollworms respectively.
  - (d) Nematodes and tobacco budworms respectively.
- **33.** Which of the following nematodes infects the root of the tobacco plants which reduces the

production of tobacco?

- (a) Melodiogyne incognitia
- (b) Ascaris
- (c) Wuckereria
- (d) Interobious

Topic **Biotechnological Applications in** Medicine 3

- 34. The first human hormone produced by recombinant technology is
  - (a) Oestrogen (b) Progesterone
  - (c) Thyroxine (d) Insulin
- 35. The demerits of using bovine insulin (from cow) and porcine insulin (from pig) in diabetic patients is-
  - (a) It leads to hypercalcemic condition
  - (b) It may cause allergic reaction
  - (c) It is expensive
  - (d) All of the above
- 36. The two polypeptides of human insulin are linked together by
  - (a) Phosphodiester bonds
  - (b) Disulphide bridge
  - (c) Hydrogen bonds
  - (d) None of the above
- 37. is removed during the maturation of proinsulin to insulin.
  - (a) A-chain (b) B-chain
  - (c) C-chain (d) Both (a) and (b)
- 38. The main challenge for production of insulin using rDNA techniques was
  - (a) Splitting A and B- peptide chains
  - (b) Addition of C- peptide to proinsulin
  - (c) Getting insulin assembled to mature form
  - (d) Removal of C- peptide from active insulin
- 39. Which of the following companies prepared human insulin in 1983?
  - (a) Monsanto (b) Eli Lilly
  - (d) GEAC (c) Genetech

#### Gene Therapy

#### **Molecular Diagnosis**

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Topic

- **45.** Why using conventional method for diagnosis is not very relevant?
  - (a) Early detection is not possible
  - (b) Not reliable
  - (c) Results are incorrect
  - (d) All of these
- **46.** Which of the following molecular diagnostic technique is used to detect the presence of a pathogen in its early stage of infection-
  - (a) Angiography
  - (b) Radiography
  - (c) Enzyme replacement technique
  - (d) Polymerase chain reaction
- 47. Why PCR is used?
  - (a) To detect HIV in suspected AIDS patients
  - (b) To detect mutation in the genes of suspected cancer patients
  - (c) Diagnose many genetic disorders
  - (d) All of the above
- **48.** A single stranded nucleic acid tagged with a radioactive molecule is called
  - (a) Plasmid (b) Probe
  - (c) Vector (d) Selectable marker
- **49.** In which of the following method, a probe is allowed to hybridise to its complementary DNA in the clone of cells?
  - (a) Enzyme linked Immono-sorbent Assay (ELISA)
  - (b) PCR
  - (c) Autoradiography
  - (d) Gene therapy
- **50.** Technique used to detect mutation in genes is known as-
  - (a) Gel electrophoresis (b) PCR
  - (c) Gene therapy (d) Autoradiography

- **40.** Treatment of genetic disorder by manipulating gene is called-
  - (a) Gene therapy
  - (b) rDNA technology
  - (c) Bone marrow transplantation
  - (d) Enzyme replacement therapy
- **41.** For the first time, gene therapy was tried on a 4 year old girl in 1990 to treat \_\_\_\_\_.
  - (a) Cytosine Deaminase (CDA)
  - (b) Adenosine Deaminase (ADA)
  - (c) Tyrosine oxidase
  - (d) Glutamate trihydrogenase
- **42.** Which kind of therapy was given in 1990 to 4 year old girl with enzyme deficiency?
  - (a) Gene therapy (b) Chemotherapy
  - (c) Immunotherapy (d) Radiation therapy
- **43.** Adenosine deaminase (ADA) deficiency can be treated by <u>A</u> and <u>B</u> but it is not fully curative. Here A and B can be
  - (a) A- gene therapy, B- radiation therapy
  - (b) A- bone marrow transplantation, Benzyme replacement therapy
  - (c) A- organ transplantation, Bhormone replacement
  - (d) A- radiation therapy, B- enzyme replacement therapy
- **44.** The advantage of beginning gene therapy prior to birth is-
  - (a) The body would not reject it as it has not yet recognised 'self'.
  - (b) This would give the body plenty of time.
  - (c) The cell being extremely young are more receptive to gene therapy.
  - (d) None of these

Topic

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- 51. Which of the following technique is based on the principle of antigen antibody interaction?(a) PCR
  - (b) ELISA
  - (c) Recombinant DNA technology
  - (d) Gene therapy

## TopicTransgenic Animals6

- **52.** Animals whose DNA is manipulated to possess and express an extra (foreign) gene are known as
  - (a) Transgenic animals (b) Hybrid animals
  - (c) Transferrin animals (d) All of the above
- 53. 95% of all the existing transgenic animals are
  - (a) Pigs (b) Cows
  - (c) Mice (d) All of these
- 54. Transgenic animals can be used to
  - (a) Study normal physiology
  - (b) Study the biological effects
  - (c) Study the vaccine safety
  - (d) All of the above
- **55.** Transgenic animals are made to serve as models for human diseases. The disease are-
  - (a) Alzheimer's disease (b) Cancer
  - (c) Cystic fibrosis (d) All of these
- **56.** Which of the following transgenic human protein products development are used to treat emphysema?
  - (a) a-1 antitrypsin (b) a-1 trypsin
  - (c) a-1 albumin (d) a-1 globulin
- **57.** When was the first transgenic cow, Rosie produced?

(a) 1979	(b) 1997
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- (c) 1996 (d) 1999
- 58. \_\_\_\_\_ was introduced in the first transgenic cow-
  - (a) a-1 antirypsin
  - (b) Human b-Lactalbumin
  - (c) b-1 antitrypsin
  - (d) None of these

- 59. The first transgenic cow, Rosie produced
  - (a) Human calcium enriched milk (2.4 g/l)
  - (b) Human protein enriched milk (2.4 g/l)
  - (c) Human calcium enriched milk (2.6 g/l)
  - (d) Human protein enriched milk (2.8 g/l)
- 60. \_\_\_\_\_ are used in testing safety of polio vaccine before they are used on human.
  - (a) Transgenic pig (b) Transgenic monkey
  - (c) Transgenic rabbits (d) Transgenic mice
- 61. \_\_\_\_\_ animals are made that carry genes which makes them more sensitive to toxic substances than non-transgenic animals.
  - (a) Transgenic (b) Mutated
  - (c) Sensitive (d) Transformed

#### Topic 7

#### **Ethical Issue**

- **62.** Exploitation of bio-resources of a nation by multinational companies without authorisation from the concerned country is referred to-
  - (a) Bioethics (b) Bioweapon
  - (c) Bio piracy (d) Bio-exploitation
- 63. Bio-piracy is related with the-
  - (a) Stealing of bio-resources
  - (b) Traditional knowledge and utilization
  - (c) Biomolecules and regarding bio-resources exploitation
  - (d) Both (a) and (c)
- 64. \_\_\_\_\_ was taken by Indian Parliament to meet and fulfill the requirements of patent terms and other emergency provisions.
  - (a) Indian Patents bill (b) Bioethics Act
  - (c) Bio Piracy Act (d) All of these
- 65. Basmati is unique for its aroma and flavour, whose \_\_A\_\_ documented varieties cultivated in \_\_B\_\_.
  - (a) A-37, B-India (b) A-27, B-India
  - (c) A-27, B-USA (d) A-30, B-USA

- **66.** Which committee takes decision regarding the validity of GM research and the safety of introducing GM-organisms for public services?
  - (a) Indian Council of Medical Research (ICMR)
  - (b) Genetic Engineering Approval Committee (GEAC)
  - (c) Indian Institute of Science Education and Research (IISER)
  - (d) Genetic Engineering Appraisal Committee (GEAC)
- 67. A \_\_\_\_\_ is granted to a person who has either invented a new and useful product, made improvement in existing product or invented a new process of making a product.
  - (a) bioethics
  - (b) patent
  - (c) bio piracy
  - (d) genetic recombination

- 68. Bio patent means
  - (a) Right to use an invention
  - (b) Right to use application are processes
  - (c) Both (a) and (b)
  - (d) None of these
- **69.** \_\_\_\_\_ have been present in India from long time yet foreign country got patent through the US Patent and Trademark Office.
  - (a) Brown rice (b) Basmati rice
  - (c) Co-667 (d) All of these

#### 70. Bioethics is-

- (a) Process of discovery and commercialisation of new products.
- (b) Use of bio resources with proper authorisation.
- (c) Standards used to regulate human activities in relation to the biological world.
- (d) All of these

#### **ANSWER KEY**

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