- (2) A and D
- (3) A and C
- (4) A, B, C and D
- **102.** Select how many statements are **true** for this picture?



- A. Found in monocotyledonous plants.
- **B.** The primary root is long lived and is assisted by a large number of roots.
- C. These roots originate from the base of the stem.
- **D.** Seen in the wheat plant.
- (1) One (2) Two
- (3) Three (4) Four
- 103. Edible part in mango is
 - (1) Mesocarp and Endocarp
 - (2) Epicarp and mesocarp



- **105.** Half-inferior ovary can be seen in the flowers of
 - (1) Cucumber (2) Guava
 - (3) Plum (4) Brinjal
- 106. In monocotyledonous seeds the outer covering of endosperm separates the embryo by a <u>X</u> layer called <u>Y</u> layer.

	X	Y
(1)	Proteinous	Aleurone
(2)	Proteinous	Pellicle
(3)	Fatty	Aleurone
(4)	Fatty	Pellicle

- 107. Root hair arise from
 - (1) Zone of cell division
 - (2) Zone of cell elongation
 - (3) The cells at maturation zone
 - (4) Root cap

- **108.** Which of the following statement(s) is/are **correct** about calyx?
 - (1) Calyx is the outermost whorl of the flower and are called sepals.
 - (2) Sepals are green, leaf like structure and protect the flower in the bud stage.
 - (3) The calyx may be gamosepalous (sepals united) or polysepalous (sepals free).
 - (4) All of these
- **109.** Match the placental types (Column I) with their examples (Column II).

			Colum	n-I		Column-II
	A.		Basal		I.	Mustard
	B .		Axile		II.	China rose
	C.		Parieta	1	III.	Dianthus
	D.		Free ce	entral	IV.	Sunflower
		A	В	С	D	
(1)	II	III	IV	Ι	
((2)	Ι	II	III	IV	
((3)	IV	/ II	Ι	III	
(4)	II	I IV	Ι	II	

110. Assertion: In fabaceae family monocarpellary, unilocular ovary is present.

Reason: In fabaceae, placentation is parietal.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (3) Assertion is true but Reason is false.
- (4) Both Assertion and Reason are false.
- **111.** Identify the different types of aestivation (A, B, and C) in corolla and select the **correct** option.



- (1) A-Imbricate, B- Twisted and C-Valvate
- (2) A-Vexillary, B-Valvate and C-Twisted
- (3) A-Imbricate, B-Twisted and C-Vexillary
- (4) A-Valvate, B-Twisted and C-Imbricate
- 112. Pneumatophores are found in
 - (1) The vegetation which is found in acidic soil.
 - (2) The vegetation which is found in marshy and saline lake.
 - (3) Turnip
 - (4) Monstera

- **113.** The lateral branches originate from basal and underground portion of the main stem, grow horizontally beneath the soil and then come out obliquely upward giving rise to leafy shoots seen in case of
 - (1) Banana and Eichhornia
 - (2) Chrysanthemum and lemon
 - (3) Mint and Opuntia
 - (4) Banana, Chrysanthemum and pineapple
- **114.** Which of the following statement(s) is/are **correct** about the fruit?
 - (i) Fruit is a mature or ripened ovule, developed before fertilization.
 - (ii) It consists of a wall or pericarp and seeds.
 - (iii) When pericarp is thick and dry, it is differentiated into outer mesocarp, middle epicarp and inner endocarp.
 - (1) Only (i) (2) Both (ii) and (iii)
 - (3) Only (ii) (4) All of these
- **115.** Which of the following statements are **correct** about the leaf?
 - (i) Leaf is a lateral, generally flattened structure borne on the stem.
 - (ii) It develops at the node and bears a bud in its axil.
 - (iii) Leaves originate from root apical meristems and arranged in an acropetal order.
 - (iv) They are the most important vegetative organs for respiration.
 - (1) (i) and (ii) (2) (ii) and (iii)
 - (3) (i), (ii) and (iv) (4) All of these
- 116. In pitcher plant, the pitcher is modified
 - (1) Root (2) Stem
 - (3) Leaf (4) Flower
- **117.** Which of the following represents the zygomorphic symmetry?
 - (1) Canna, mustard, chilli, Datura
 - (2) Mustard, Canna, pea, Datura
 - (3) Pea, bean, Cassia, gulmohar
 - (4) Pea, bean, Canna, chilli
- **118.** Assertion: The plumule enclosed in sheath are called coleoptile.

Reason: The radicle enclosed in sheath are called coleorhiza.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (3) Assertion is true but Reason is false.
- (4) Both Assertion and Reason are false.

- **119.** Select the **correct** pair of statement for cymose type of inflorescence
 - A. Main axis terminates into flower.
 - **B.** Flower are borne in basipetal order.
 - C. Main axis does not terminates into flower.
 - **D.** Flower are borne in acropetal order.
 - (1) A and B only
 - (2) C and D only
 - $(3) \quad A \text{ and } D \text{ only} \\$
 - (4) B and C only
- **120.** Select the **incorrect** statement for Liliaceae from the following:
 - (1) Bisexual and zygomorphic flower
 - (2) Bisexual and actinomorphic flower
 - (3) Leaves are mostly basal, alternate with parallel venation.
 - (4) Tepal shows valvate aestivation.
- 121. Keel is the characteristic feature of which flower
 - (1) Tulip (2) Indigofera
 - (3) *Aloe* (4) Tomato
- 122. $\oplus \vec{Q'} K_{(5)} \widehat{C_{(5)} A_5 \underline{G}_{(2)}}$ is the floral formula of
 - (1) Allium (2) Sesbania
 - (3) Petunia (4) Brassica
- **123.** Select **correct** labelling for **A** to **E** in the below figure



- A-Region of maturation, B-Root cap, C-Region of meristematic activity, D-Root hair, E-Region of elongation
- A-Root hair, B-Region of maturation, C-Region of elongation, D-Root cap, E-Region of meristematic activity
- (3) A–Root cap, B–Region of maturation, C–Region of elongation, D–Root hair, E–Region of meristematic activity
- (4) A–Region of meristematic activity, B–Region of elongation, C–Region of maturation, D–Root hair, E–Root cap

- **124.** Which of the following are the major functions of the petiole?
 - (1) The petiole helps to hold the blade.
 - (2) It allows the leaf blades to flutter in the wind, thereby decreasing its temperature and heating the leaf, which occurs when fresh air is attached to the leaf's surface.
 - (3) It provides rigidity to the stem and act as channels of transport for water, minerals and food materials.
 - (4) Both (1) and (2)
- 125. Which parts in ginger and onion are edible-
 - (1) Ginger: Root and Onion: Fleshy leaves
 - (2) Ginger: Rhizome and Onion: Fleshy leaves
 - (3) Ginger and Onion: Root
 - (4) Ginger: Leaves and Onion: Root
- **126.** Read the following statements and mark the right option.
 - A. Rachis represents the midrib of the leaf in neem.
 - **B.** Lamina represents the leaf blade.
 - C. Sterile stamen is called staminode.
 - (1) Only B is correct.
 - (2) Only B and C are correct.
 - (3) Only A and C are correct.
 - (4) All A, B and C are correct.
- 127. Non-endospermous seed is present in
 - (1) Bean (2) Gram
 - (3) Pea (4) All of these
- **128.** Select correct for the phyllotaxy shown by the following plant



- (1) A single leaf arises at each node in alternate manner.
- (2) A pair of leaves arise at each node and lie opposite to each other.
- (3) It is opposite type of phyllotaxy.
- (4) Both (1) and (3)

- **129.** How many of the following are **correct** for racemose type of inflorescence-
 - **A.** It can be shown as



- **B.** The flowers are borne in a basipetal order.
- C. The main axis continues to grow.
- **D.** It shows limited growth.
- (1) One (2) Two
- (3) Three (4) Four
- **130.** Which of the following is not a stem modification?
 - (1) Thorns of Citrus
 - (2) Tendrils of cucumber
 - (3) Flattened structures of *Opuntia*
 - (4) Pitcher of venus fly trap
- **131.** Select the **incorrect** statement from the following.
 - (1) Parallel venation is the characteristics of most of monocots.
 - (2) In parallel venation veins run parallel to each other with in a leaf lamina.
 - (3) A bud is present in the axil of petiole in both simple and compound leaves, but not in the axil of leaflets of the compound leaf.
 - (4) The shape, margin, apex, surface and extent of incision of lamina is same in different leaves.
- **132.** Identify **A to C** in dicotyledonous seed.



- (1) A-Hilum, B-Micropyle, C-Seed coat
- (2) A-Seed coat, B-Hilum, C-Micropyle
- (3) A-Micropyle, B-Seed coat, C-Hilum
- (4) A-Micropyle, B-Hilum, C-Seed coat
- **133.** Which of the following shows whorled phyllotaxy?
 - (1) Mustard (2) China rose
 - (3) Alstonia (4) Calotropis

- **134.** Tricarpellary, syncarpous gynoecium is found in flowers of
 - (1) Liliaceae (2) Solanaceae
 - (3) Fabaceae (4) Brassicaceae
- **135.** Assertion: Maize has stilt roots.

Reason: They give additional support and allow better absorption of water and mineral salts.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (3) Assertion is true but Reason is false.
- (4) Both Assertion and Reason are false.

SECTION - B

- 136. Primary root is the direct elongation of the
 - (1) Pedicel (2) Radicle
 - (3) Plumule (4) Stamen
- **137.** Roots developed from parts of the plant other than radicle are called
 - (1) Tap roots
 - (2) Fibrous roots
 - (3) Adventitious roots
 - (4) Nodular roots
- 138. The term 'polyadelphous' is related to
 - (1) Androecium
 - (2) Corolla
 - (3) Calyx
 - (4) Gynoecium
- **139.** Read the following statements and select the **correct** option

Statement 1: Flowers with bracts-reduced petiole found at the base of the pedicel-are called bracteate and those without bracts are called ebracteate.

Statement 2: Corolla is composed of petals.

- (1) Both the statements are correct.
- (2) Statement 1 is correct and statement 2 is incorrect.
- (3) Statement 2 is correct and statement 1 is incorrect.
- (4) Both the statements are incorrect.
- **140.** Which one of the following is a xerophytic plant in which the stem is modified into flat green and succulent structure?
 - (1) Opuntia (2) Allium
 - (3) Hydrilla (4) Acacia

141. Select the correct match

- (1) Monoadelphous- *Citrus*
- (2) Diadelphous- Mustard
- (3) Polyadelphous- China rose
- (4) Variation in the length of filaments within a flower-*Salvia*
- 142. Select the incorrect matching:
 - (1) Ornamental Tulip, *Gloriosa*, Lupin, sweet pea, *Petunia*
 - (2) Medicine Muliathi, Belladonna, Aloe
 - (3) Fodder Sesbania, Trifolium
 - (4) Edible oil Soyabean, groundnut, Asparagus
- **143.** Read the following and select the **correct** option:

Statement I: A seed is made up of a seed coat and an embryo.

Statement II: The embryo is made up of a radicle, an embryonal axis and one (as in gram and pea) or two cotyledons (as in wheat, maize).

- (1) Both the statements are correct.
- (2) Statement I is correct and statement II is incorrect.
- (3) Statement II is correct and statement I is incorrect.
- (4) Both the statements are incorrect.
- **144.** Read the following statements regarding placentation and select the **correct** option.
 - A. Ovules develop on the inner wall of the ovary.
 - **B.** Ovules develop on the periphery.
 - C. Ovary is one-chambered but it becomes two chambered.
 - **D.** False septum is present
 - (1) Axile (2) Parietal
 - (3) Free central (4) Basal

SECTION - A

- **151.** Glomerular filtration rate is
 - (1) 125 ml/day (2) 180 L/day
 - (3) 1.8 L/day (4) 1.25 ml/day
- **152.** Sarcoplasmic reticulum is a storehouse of which ion (1) Ca^{2+} (2) Na^+ (3) K^+ (4) Fe^{2+}
- **153.** The pectoral and pelvic girdles and the bones of limb form
 - (1) Axial skeleton
 - (2) Appendicular skeleton
 - (3) Visceral skeleton
 - (4) Outer skeleton

- 145. Assertion: Brinjal shows epipetalous condition. Reason: When pistils are attached to the petals, they are epipetalous.
 - (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 - (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
 - (3) Assertion is true but Reason is false.
 - (4) Both Assertion and Reason are false.
- 146. The seed coat has two layers-
 - (1) The outer testa and the inner hilum
 - (2) The outer testa and the inner tegmen
 - (3) The outer tegmen and the inner hilum
 - (4) The outer tegmen and the inner testa
- **147.** The pattern of arrangement of leaves on the stem is known as
 - (1) Heterophylly
 - (2) Phyllode
 - (3) Phyllotaxy
 - (4) Phylloclade
- 148. Mango is developed from
 - (1) Monocarpellary inferior ovary
 - (2) Monocarpellary superior ovary
 - (3) Multicarpellary inferior ovary
 - (4) Multicarpellary superior ovary
- **149.** Cotyledon of maize grain is called
 - (1) Coleorhiza (2) Coleoptile
 - (3) Scutellum (4) Plumule
- **150.** In unilocular ovary with a single ovule the placentation is
 - (1) Axile (2) Marginal
 - (3) Basal (4) Free Central

(ZOOLOGY)

154. Which of the following pair is wrong?

- (1) Uricotelic Birds
- (2) Ureotelic Insects
- (3) Ammonotelic Tadpole
- (4) UreotelicElephant
- 155. The acromion process articulates with the
 - (1) Scapula (2) Clavicle
 - (3) Ribs (4) Vertebral column

156. The functional unit of the contractile system in the striped muscle is

- (1) Z-band (2) A-band
- (3) Myofibril (4) Sarcomere

- **157.** All of the functions are performed by nephron except
 - (1) Secretion (2) Synthesis of urea
 - (3) Reabsorption (4) Filteration
- 158. Choose the correct ones
 - **I.** Efferent arteriole carries the blood away from the glomerulus toward the renal artery
 - **II.** Afferent arteriole carries the blood to the renal vein
 - **III.** Podocytes form minute spaces (slip pores) for the filtration of blood into the Bowman's capsule
 - (1) I, II & III (2) II & III only
 - (3) Only III (4) Only I
- **159.** Cartilage has slightly pliable matrix due to
 - (1) Ca^{2+} (2) Mg^{2+}
 - (3) Chondroitin salt (4) Phosphorus
- 160. Binding of Ca^{2+} with _____ in the skeletal muscles and leads to the exposure of the binding site for _____ on the filament _____.
 - (1) Troponin, myosin, actin
 - (2) Troponin, actin, relaxin
 - (3) Actin, myosin, troponin
 - (4) Tropomyosin, myosis, actin
- 161. Given below are two statements

Statement I: A hairpin-shaped Henle's loop which has a descending and ascending limb

Statement II: A large vessel of the network runs parallel to the Henle's loop forming a 'U' shaped vasa recta.

In the light of the above statements choose the most appropriate answer from the options given below

- (1) Both statement I and statement II are correct
- (2) Both statement I and statement II are incorrect
- (3) Statements I is correct but statement II is incorrect
- (4) Statement I is incorrect but statement II is correct
- **162.** The glomerular capillary blood pressure causes filtration of blood through three layers in a sequence of
 - (1) Endothelium \rightarrow Basement membrane \rightarrow Epithelium of Bowman's capsule
 - (2) Epithelium of Bowman's capsule \rightarrow Endothelium \rightarrow Basement membrane

- (3) Basement membrane \rightarrow Endothelium \rightarrow Epithelium of Bowman's capsule
- (4) Epithelium of Bowman's capsule \rightarrow Basement membrane \rightarrow Endothelium
- **163.** Which of the following is incorrect about skeletal muscles?
 - (1) Striped appearance under microscope hence called straited muscle
 - (2) They are voluntary muscles
 - (3) Primarily involved in locomotory actions and changes the body postures
 - (4) They are involuntary muscles
- **164.** Human skull is
 - (1) Monocondylic (2) Dicondylic
 - (3) Tricondylic (4) Acondylic
- **165.** Different types of excretory structures and animals are below. Match them appropriately and mark the **correct** answer from among those given below:

	E	Excretory				Animal	
	S	Structure/Organ					
Α	P	Protonephridia				1	Prawn
B	N	Nephirdia				2	Cockroach
С	M	Malpighian tubules			3	Earthworm	
D	G	Green gland or			4	Flatworms	
	ar	antennal gland					
Codes							
	Α	В	С	D			
(1)	4	3	2	1			

(2)	2	3	1	2
(3)	4	3	1	2
(4)	2	3	2	4

166. Identify A, B, C and D in the given figure.



- (1) A-Sacrolemma, B-Blood capillary, C-Fascicles, D-Muscle fibre
- (2) A-Blood capillary, B-Muscle fibre, C-Fascicles, D-Sarcolemma
- (3) A-Sarcolemma, B-Muscle fibre, C-Fascicles, D-Blood capillary
- (4) A-Muscle fibre, B-Sarcolemma, C-Blood capillary, D-Fascicles.

- **167.** The part of Loop of Henle that is impermeable to water
 - (1) Descending limb
 - (2) Ascending limb
 - (3) Both (1) and (2)
 - (4) None of the above
- **168.** Kidneys nearly have _____ complex tubular structures called nephrons.
 - (1) 1 million (2) 2 million
 - (3) 2.5 million (4) 0.5 million

169. Select the correct matching:

Column I	Column II	Column III	
A. Paramoecium	1. Cilia	X. Movement	
		of food	
		through	
		cytopharynx	
		and	
		locomotion.	
B. Hydra	2. Tentacles	Y. Capturing	
		of prey and for	
		locomotion.	
C. Human	3. Limbs	Z. Changes in	
		body posture	
		and for	
		locomotion.	

- (1) A-1-X, B-2-Y, C-3-Z
- (2) A-1-Z, B-3-X, C-2-Y
- (3) A-3-Z, B-1-X, C-2-Y
- (4) A-2-Y, B-3-X, C-1-Z
- **170.** The light bands (I-bands) of a skeletal muscles are known as
 - (1) Isotropic bands
 - (2) Anisotropic bands
 - (3) Intercalated disc
 - (4) Cross bridges
- 171. Assertion Reason question:

Assertion A: If Henle Loop is absent, urine will be more concentrated

Reason R: Descending limb of the loop of Henle is impermeable to water

- (1) Both A and R are correct, but R is correct explanation of A
- (2) Both A and R are correct, but R does not explain A
- (3) A is correct where as R is wrong
- (4) Both A and R are wrong

- **172.** Which one of the following is showing the correct sequential order of vertebrae in the vertebral column of human beings?
 - (1) Cervical lumbar thoracic sacral coccygeal
 - (2) Cervical thoracic sacral lumbar coccygeal
 - (3) Cervical sacral thoracic lumbar coccygeal
 - (4) Cervical thoracic lumbar sacral coccygeal
- **173.** Projections of the renal pelvis are called_____
 - (1) Hilum
 - (2) Calyces
 - (3) Medullary pyramids
 - (4) Renal columns
- **174.** The hard and protective outer covering of brain is known as
 - (1) Cranium (2) Condyle
 - (3) Meninges (4) All of these
- **175.** Each organised skeletal muscle in our body is made up of a number of muscle bundles held together by a common collagenous connective tissue layer called
 - (1) Tunicae (2) Fascia
 - (3) Pellicle (4) Capsule
- **176.** The cup-shaped cavity for the articulation of the head of the femur is called
 - (1) Glenoid cavity (2) Acetabulum
 - (3) Obturator (4) Sigmoid notch
- 177. Which is not a feature of cortical nephron?
 - (1) They are approximately 85% of total nephrons
 - (2) The renal corpuscle of such nephron is in outer cortex near the renal capsule
 - (3) Their Loop of Henle are short and do not go deep in medulla
 - (4) They are associated with vasa Recta
- 178. Each nephron has two parts the (a) _____ and the (b)
 - (1) (a) Glomerulus (b) Renal tubule
 - (2) (a) Glomerulus (b) Renal corpuscle
 - (3) (a) Bowman's capsule (b) Renal tubule
 - (4) (a) Malpighian body (b) Renal corpuscle
- **179.** Muscles are characterised by
 - (1) Excitability and contractility
 - (2) Extensibility
 - (3) Elasticity
 - (4) All of these

180. Kidneys are located between:

- (1) $T_{12} L_6$ (2) $T_6 T_{12}$
- (3) $T_{12} L_3$ (4) $T_1 T_6$

181. Which of the following is incorrect about ribs?

- (1) Each rib is a thin and flat bone connected dorsally to the vertebra column and ventrally to the sternum
- (2) Ribs has two articulation surface on its dorsal end which are called bicephalic
- (3) Ventrally ribs are connected to stenum by elastic cartilage
- (4) First 7 pairs are called true ribs. The 8, 9 and 10th pair is known as false (vertebrochondral) ribs and the 2 pairs (11th and 12th) are known as floating ribs.
- **182.** Complete the following sentence
 - (a) _____ is a tuft of capillaries formed by the (b) _____. Blood from the (c) _____ is carried away by an (d)
 - (1) (a) Glomerulus (b) afferent arteriole (c) Glomerulus (d) efferent arteriole
 - (2) (a) Bowman's Capsule (b) Glomerulus (c) PCT (d) DCT
 - (3) (a) PCT (b) DCT (c) Henle's loop (d) Vasa recta
 - (4) (a) Glomerulus (b) efferent arteriole (c) Glomerulus (d) afferent arteriole
- **183.** Which substances are actively reabsorbed from filtrate into blood?
 - (1) H_2O (2) Glucose
 - (3) H^+ (4) HCO_3^-
- **184.** The excretory structure of *Amphioxus* (Cephalochordate) is
 - (1) Flame cell
 - (2) Coxal gland
 - (3) Malpighian tubules
 - (4) Green gland
- **185.** Read the following statements and find the number of correct statements w.r.t. thick filaments from the options given below:
 - **A.** Each myosin (thick) filament is also a polymerised protein.
 - **B.** Many monomeric proteins called meromyosins constitute one thick filament.
 - **C.** Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter is called the light meromyosin (LMM).

- **D.** The HMM component, i.e., the head and short arm projects outwards at regular distance and angle from each other from the surface of a polymerised myosin filament and is known as cross arm.
- **E.** The globular head is an active ATPase enzyme and has binding sites for ATP and active sites for actin
- (1) 1 (2) 2
- (3) 4 (4) 5

SECTION - B

- **186.** Some amount of _____ may be retained in the kidney matrix to maintain a desired osmolarity.
 - (1) Urea (2) Uric acid
 - (3) Ammonia (4) Carbon dioxide
- 187. Smooth muscles help in
 - (1) Transportation of food through the digestive tract
 - (2) Transfer of gametes through genital tract
 - (3) Micturition by urinary bladder
 - (4) All the above
- **188.** Match the items given in column-I with those in column-II and select the correct option given below

	Column I		Column II
	(Function)		(Part of
			Excretory
			system)
Ι	Ultrafiltration	Α	Henle's loop
Π	Concentration	B	Ureter
	of urine		
III	Transport of	С	Urinary bladder
	urine		
IV	Storage of urine	D	Malpighian
			corpuscle
		e	Proximal
			convoluted tubule

- (1) I-D, II-E, III-B, IV-C
- (2) I-D, II-A, III-B, IV-C
- (3) I-E, II-D, III-A, IV-C
- (4) I-E, II-D, III-A, IV-B
- **189.** Which of the following is a simple form of movement?
 - (1) Streaming of protoplasm in Amoeba
 - (2) Ciliary movement in Paramecium
 - (3) Flagellar movement of Euglena
 - (4) All of these

- 190. Sarcolemma is a membrane found over
 - (1) Nerve fibre
 - (2) Smooth muscle
 - (3) Skeletal muscle fibre
 - (4) Pericardium
- 191. Given below are two statements

Statement I: Animals accumulate only ammonia, urea, and uric acid.

Statement II: Accumulation of substances takes place either by metabolic activities or by other means like excess ingestion.

In the light of the above statements choose the most appropriate answer from the options given below

- (1) Both statements I and II are correct
- (2) Both statements I and statement II are incorrect
- (3) Statements I is correct but statement II is incorrect
- (4) Statement I is incorrect, but statement II is correct
- 192. Read the assertion and reason carefully to mark the correct option out of the options given below: Assertion: Ciliary movement occurs in most of our internal tubular organs which are lined by ciliated epithelium.

Reason: Passage of ova through the female reproductive tract is facilitated by the cilliary movement.

- (1) Both the assertion and the reason are true and the reason is correct explanation of the assertion
- (2) Both the assertion and reason are true but the reason is not a correct explanation of the assertion
- (3) The assertion is true but the reason is false
- (4) Both the assertion and reason are false
- **193.** Which of the following statements about the striated muscles is false?
 - I. Thick filaments in the 'A' band are also held together in the middle of this band by a thin fibrous membrane called 'M' line.
 - **II.** In the centre of each 'I' band is an elastic fibre called 'Z' line which bisects it
 - **III.** The thin filaments are firmly attached to the 'Z' line.
 - **IV.** This central part of thick filament, not overlapped by thin filaments is called the 'H' zone.

- (1) All of these
- (2) Only II
- (3) I and IV only
- (4) None of these
- 194. Podocytes are found in
 - (1) Glomerular Capillaries
 - (2) Visceral layer of Bowmans Capsule
 - (3) Parietal layer of Bowmans Capsule
 - (4) Loop of Henle
- **195.** Arrange the following parts of the nephron sequentially and select the correct option accordingly
 - I. Glomerulus
 - II. Bowman's capsule
 - III. Henle's loop
 - IV. Proximal convoluted tubule
 - V. Collecting duct
 - VI. Distal convoluted tubule
 - (1) $I \rightarrow II \rightarrow III \rightarrow IV \rightarrow V \rightarrow VI$
 - (2) $I \rightarrow II \rightarrow IV \rightarrow III \rightarrow VI \rightarrow V$
 - $(3) \quad I \to II \to IV \to III \to V \to VI$
 - (4) $VI \rightarrow III \rightarrow II \rightarrow I \rightarrow IV \rightarrow V$
- **196.** Carpals, metacarpals, tarsals, metatarsals are _____ and in numbers respectively
 - $(1) \quad 8, 5, 7, 5 \qquad (2) \quad 8, 7, 5, 5$
 - $(3) \quad 8, 5, 8, 5 \qquad (4) \quad 8, 5, 5, 7$

197. In a glomerulus

- (1) Afferent capillaries are thicker than efferent capillaries
- (2) Afferent arteriole is thicker than efferent arteriole
- (3) Afferent arteriole is thinner than efferent arteriole
- (4) Afferent capillaries are thinner than efferent capillaries
- 198. Filtration of the blood takes place at
 - (1) PCT
 - (2) DCT
 - (3) Collecting ducts
 - (4) Malpighian body
- **199.** Which of the following cells exhibit amoeboid movement?
 - (1) Macrophages
 - (2) Leucocytes
 - (3) RBCs
 - (4) Both (1) and (2)

- **200.** Which one of the following statements is incorrect?
 - The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces
 - (2) Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis
- (3) Glomerulus along with Bowman's capsule is called the renal corpuscle
- (4) Renal corpuscle, Proximal Convoluted Tubule (PCT) and Distal Convoluted Tubule (DCT) of the nephron are situated in the cortical region of kidney.

mesocarp and an inner stony hard endocarp.

Root half arise from the cens at maturation zone.



108. (4)

NCERT Page No. 73

The calyx is the outermost whorl of the flower and the members are called sepals. Generally, sepals are green, leaf like and protect the flower in the bud stage. The calyx may be gamosepalous (sepals united) or polysepalous (sepals free).

109. (3)

NCERT Page No. 75, 76

Basal \rightarrow Sunflower Axile \rightarrow China rose Parietal \rightarrow Mustard Free central \rightarrow Dianthus

110. (3)

NCERT Page No. 79

The family Fabaceae, is commonly known as the legume, pea, or bean family and consists mostly of a genera that are agriculturally important food plants. The plants have unicarpelate, superior ovary with marginal placentation. The type of placentation is not the reason for ovary being monocarpellary.

111. (4)

NCERT Page No. 74



Valvate petals are close to each other and do not overlap. In twisted, petals overlap each other regularly. In imbricate, there are five petals, arranged in such a way that one petal is completely external and one is completely internal.

112. (2)

NCERT Page No. 67

In some plants such as *Rhizophora* growing in swampy areas, many roots come out of the ground and grow vertically upwards. Such roots, called pneumatophores, help to get oxygen for respiration.

113. (4)

NCERT Page No. 69

In banana, pineapple and *Chrysanthemum*, the lateral branches originate from the basal and underground portion of the main stem, grow horizontally beneath the soil and then come out obliquely upward giving rise to leafy shoots.

114. (3)

NCERT Page No. 76

Fruit is a mature or ripened ovary, developed after fertilization. The pericarp may be dry or fleshy. When pericarp is thick and fleshy, it is differentiated into the outer epicarp, the middle mesocarp and the inner endocarp.

115. (1)

NCERT Page No. 69 Leaves originate from shoot apical meristems and

are arranged in an acropetal order. They are the most important vegetative organs for photosynthesis.

116. (3)

NCERT Page No. 71

Leaves of certain insectivorous plants such as pitcher plant, venus-fly trap are also modified leaves.

117. (3)

NCERT Page No. 72

When flower can be divided into two similar halves only in one particular vertical plane, it is zygomorphic, e.g., pea, gulmohur, bean, *Cassia*.

118. (2)

NCERT Page No. 77

The plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively.

119. (1)

NCERT Page No. 72

In cymose type of inflorescence the main axis terminates in a flower, hence is limited in growth.The flowers are borne in a basipetal order.

120. (2)

NCERT Page No. 81

Bisexual, actinomorphic flower

NCERT Page No. 79

Many plants belonging to the family Fabaceae are sources of pulses (gram, arhar, sem, moong, soyabean; edible oil (soyabean, groundnut); dye (Indigofera); fibres (sunhemp); fodder (*Sesbania*, *Trifolium*), ornamentals (lupin, sweet pea); medicine (muliathi) .In these corolla has five petals, polypetalous, papilionaceous, consisting of a posterior standard, two lateral wings, two anterior ones forming a keel (enclosing stamens and pistil) showing vexillary aestivation .

122. (3)

NCERT Page No. 80

The given floral formula is of the Solanaceae family, i.e. of *Petunia*, while *Brassica* is from Brassicaceae whereas, *Allium* belongs to Liliaceae and *Sesbania* is from family Fabaceae. The characteristic features of Solanaceae are (i) Inflorescence - Cymose (ii) Flower - Ebracteate, actinomorphic, bisexual, pedicellate. (iii) Calyx - Sepals 5, gamosepalous, valvate aestivation. (iv) Corolla - pepals 5, twisted or valvate aestivation. (v) Androecium - Stamens 5, epipetalous. (vi) Gynoecium - Bicarpellary, syncarpous, axile placentation, superior ovary and bilocular. The characters of the family Fabaceae are represented in the following floral formula e. g. *Petunia*.

123. (2)

NCERT Page No. 67



124. (1)

NCERT Page No. 60

The petiole help hold the blade to light. Long thin flexible petioles allow leaf blades to flutter in wind, thereby cooling the leaf and bringing fresh air to leaf surface. Veins provide rigidity to the leaf blade and act as channels of transport for water, minerals and food materials.

125. (2)

NCERT Page No. 68, 71

Ginger: Rhizome; Onion: Fleshy leaves

126. (4)

NCERT Page No. 70, 71, 75

A. Rachis represents the midrib of the leaf in neem.

B. Lamina represents the leaf blade.

C. Sterile stamen is called staminode.

127. (4)

NCERT Page No. 77

In plants such as bean, gram and pea, the endosperm is not present in mature seeds and such seeds are called non-endospermous.

128. (1)

NCERT Page No. 71

In alternate type of phyllotaxy, a single leaf arises at each node in alternate manner, as in china rose, mustard and sun flower plants.

129. (2)

NCERT Page No. 72

In cymose type of inflorescence the main axis terminates in a flower, hence is limited in growth. The flowers are borne in a basipetal order.

130. (4)

NCERT Page No. 71

Leaves of certain insectivorous plants such as pitcher plant, venus-fly trap are modified leaves.

131. (4)

NCERT Page No. 70

The shape, margin, apex, surface and extent of incision of lamina varies in different leaves.

132. (1)

NCERT Page No. 70



133. (3)

NCERT Page No. 71

If more than two leaves arise at a node and form a whorl, it is called whorled, as in *Alstonia*.

134. (1)

NCERT Page No. 81

Tricarpellary, syncarpous gynoecium is found in flowers of Liliaceae.

Gynoecium: tricarpellary, syncarpous, ovary superior, trilocular with many ovules; axile placentation.

135. (1)

NCERT Page No. 67

The stems of maize and sugarcane have supporting roots coming out of the lower nodes of the stem. These are called stilt roots.

136. (2)

NCERT Page No. 65

In majority of the dicot plants, the direct elongation of the radicle leads to the formation of primary root.

137. (3)

NCERT Page No. 66

In some plants, like grass, *Monstera* and the banyan tree, roots arise from parts of the plant other than the radicle and are called adventitious roots.

138. (1)

NCERT Page No. 75

The stamens may be united into one bunch or one bundle (monoadelphous) as in china rose, or two bundles (diadelphous) as in pea, or into more than two bundles (polyadelphous) as in *Citrus*.

139. (3)

NCERT Page No. 72

Flowers with bracts-reduced leaf found at the base of the pedicel-are called bracteate and those without bracts, ebracteate.

140. (1)

NCERT Page No. 68

Some plants of arid regions modify their stems into flattened (*Opuntia*), or fleshy cylindrical (*Euphorbia*) structures.

141. (4)

NCERT Page No. 75

The stamens may be united into one bunch or one bundle (monoadelphous) as in china rose, or two bundles (diadelphous) as in pea, or into more than two bundles (polyadelphous) as in *citrus*. There may be a variation in the length of filaments within a flower, as in Salvia and mustard.

142. (4)

Vegetable- Asparagus

143. (2)

NCERT Page No. 76

NCERT Page No. 81

The embryo is made up of a radicle, an embryonal axis and one (as in wheat, maize) or two cotyledons (as in gram and pea).

144. (2)

NCERT Page No. 75

In parietal placentation, the ovules develop on the inner wall of the ovary or on peripheral part. Ovary is one-chambered but it becomes two chambered due to the formation of the false septum, e.g., mustard and *Argemone*.

145. (3)

NCERT Page No. 75

When stamens are attached to the petals, they are epipetalous as in brinjal, or epiphyllous when attached to the perianth as in the flowers of lily.

146. (2)

NCERT Page No. 66

The outermost covering of a seed is the seed coat. The seed coat has two layers, the outer testa and the inner tegmen.

147. (3)

NCERT Page No. 71

Heterophylly refers to the different shapes of leaves present at different stages of life or in different environmental conditions.

Phyllodes are modified petioles or leaf stems, which are leaf-like in appearance and function.

Phylloclade is the structure formed when the stem becomes flattened, green, leaf like and performs photosynthesis. Example: *Cactus*.

148. (2)

NCERT Page No. 76

In mango and coconut, the fruit is known as a drupe. They develop from monocarpellary superior ovaries and are one seeded.

149. (3)

NCERT Page No. 77 Maize grain consists of one large and shield shaped cotyledon known as scutellum.

151. (2)

GFR is the amount of filtrate formed per minute by the glomerulus of the nephrons in the kidneys. In a healthy person, the GFR is about 125 ml/min which makes it 7.5 liters per hour and 180 liters per day.

NCERT 11th Page no. 294

152. (1)

Sacroplasmic reticulum is the store house of calcium ions

NCERT 11th Page no. 307

153. (2)

The pectoral, pelvic girdles, and the bones of the limbs form the appendicular skeleton.

NCERT 11th Page no.310

154. (2)

Insects excrete nitrogenous wastes as uric acid hence are uricotelic. Ureotelic animals inolve mammals, adult amphibian and elasmobranchs. Whereas, birds are uricotelic and tadpoles excretion ammonia. Elephant being a mammal is ureotelic.

NCERT Page no. 291

155. (2)

The acromion process articulates with the clavicle. NCERT Page no. 311

156. (4)

The portion of the myofibril between two successive 'Z' lines is considered as the functional unit of contraction and is called a sarcomere.

NCERT Page no. 305

150. (3)

NCERT Page No. 65

In basal placentation, the placenta develops at the base of ovary and a single ovule is attached to it, as in sunflower, marigold.

(ZOOLOGY)

157. (2)

Urine formation in out body is mainly carried out in three phases namely

- 1. Glomerular filtration
- 2. Reabsorption
- 3. Secretion

NCERT Page no. 293

158. (3)

Podocytes form minute spaces (slit pores) for the filtration of blood into the Bowman's capsule.

NCERT Page no. 292

NCERT Page no. 309

159. (3)

Cartilage has a slightly pliable matrix due to the presence of chondroitin salts.

160. (1)

Increase in Ca++ level leads to the binding of calcium with a subunit of troponin on actin filaments and thereby remove the masking of active sites for myosin. Utilising the energy from ATP hydrolysis, the myosin head now binds to the exposed active to form a cross bridge.

NCERT Page no. 307

161. (3)

Minute vessel runs parallel to Henle's loop forming a "U" shaped vasa recta.

NCERT Page no. 294

162. (1)

The glomerular capillary blood pressure causes filtration of blood through 3 layers, i.e., the endothelium of glomerular blood vessels, the epithelium of Bowman's capsule and a basement membrane between these two layers. 163. (4)

Skeletal muscles are voluntary muscles whereas visceral and cardiac muscles are involuntary muscles.

NCERT Page no. 303

164. (2)

The human skull is dicondylic as it has two occipital condyles.

NCERT Page no. 310

165. (1)

Animal kingdom possess a variety of excretory structures for excretion.

- 1. Prawn possesses green glands or antennal glands as their excretory structures
- 2. Cockroach possesses malpighian tubules as their excretory structures.
- 3. Earthworm possesses nephridia as their excretory structures.
- 4. Flatworm possesses protonephridia as their excretory structures

NCERT Page no. 291

166. (4)

Diagram based question.

NCERT Page no. 304 (fig 20.1)

167. (2)

The ascending limb of loop of henle is imperable to water but allows transport of electrolyte actively or passively. The descending limb of loop of henle is permeable to water but almost impermeable to electrolyte.

NCERT Page no. 294

168. (2)

Each kidney has nearly one million complex tubular structures called nephrons. So in both kidneys, there are nearly two million nephrons.

NCERT Page no. 291

169. (1)

Locomotory structures need not be different from those affecting other types of movements.

For example, in *Paramoecium*, cilia helps in the movement of food through cytopharynx and in locomotion as well.

Hydra can use its tentacles for capturing its prey and also use them for locomotion.

Humans use limbs for changes in body postures and locomotion as well.

NCERT Page no. 302

170. (1)

A detailed study of the myofibril has established that the straited appearance is due to the distribution pattern of two important proteins – Acting and Myosin. The light bands contain actin and is called I-band or Isotropic band, whereas the dark band called 'A' or Anisotropic band contains myosin.

NCERT Page no. 304

171. (4)

Descending limb of the loop of Henle is permeable to water but impermeable to electrolytes.

Henle's loop plays a role in the reabsorption of water from the filtrate, thereby making the urine more concentrated.

Without the loop of Henle, a lot of water would be lost from the body and the regulation of water content in urine would be diluted.

NCERT Page no. 294

172. (4)

Our vertebral column is formed by 26 serially arranged units called vertebrae and is dorsally placed.

It extends from the base of the skull and constituents the main framework of the trunk.

Each vertebra has a central hollow portion (neural canal) through which the spinal cord passes.

The vertebral column is differentiated into cervical (7), thoracic (12), lumbar (5), sacral (1-fused) and coccygeal (1-fused) regions starting from the skull.

NCERT Page no. 310

173. (2)

Inner to the Hilum there is a broad funnel-shaped space called the renal pelvis with projections called calyces.

NCERT Page no. 291

174. (1)

The hard and protective outer covering of brain is known as cranium.

175. (2)

Each organised skeletal muscle in our body in made of a number of muscle bundles or fascicles held together by a common collagenous connective tissue layer called fascia.

NCERT Page no. 304

176. (2)

Acetabulum is a cup-shaped cavity to which the head of the femur is articulated.

NCERT Page no. 311

177. (4)

In humans, about 85% of the nephrons are cortical nephrons and about 15% are juxtamedullary nephrons. Cortical nephrons are characterised by the presence of a short Loop of Henle that extends only up to the outer region of the renal medulla. Due to the reduced length of the Loop of Henle, vasa recta are absent in cortical nephrons.

NCERT Page no. 293

178. (1)

Each nephron has two parts- the glomerulus and the renal tubule.

NCERT Page no. 292

179. (4)

Muscles are characterised by special properties like excitability, contractility, extensibility, and elasticity.

NCERT Page no. 303

180. (3)

Kidneys are located between the last thoracic and third lumbar vertebra close to the dorsal inner wall of the abdominal cavity.

NCERT Page no. 291

181. (3)

There are 12 pairs of ribs.

Each rib is a thin flat bone connected dorsally to the vertebral column and ventrally to the sternum.

It has two articulation surfaces on its dorsal end and is hence called bicephalic.

The first seven pairs of rbis are called true ribs.

Dorsally, they are attached to the thoracic vertebrae and ventrally connected to the sternum with the help of hyaline cartilage.

The 8th, 9th and 10th pairs of ribs do not articulate directly with the sternum but join the seventh rib with the help of hyaline cartilage.

These are called vertebrochondral (false) ribs.

The last two pairs (11th and 12th) of ribs are not connected ventrally and are, therefore, called floating ribs.

NCERT Page no. 310

182. (1)

Glomerulus is a tuft of capillaries formed by the afferent arteriole- a fine branch of the renal artery. Blood from the glomerulus is carried away by an efferent arteriole.

NCERT Page no. 292

183. (2)

Glucose, amino acids, NaCl and other essential salts are reabsorbed in the second step of urine formation i.e., tubular reabsorption. These essential substances are filtered from blood in the first step called glomerular filtration and are reabsorbed in the blood actively as they are vital for body function.

NCERT Page no. 293

184. (1)

Flame cells/Solenocytes-Amphioxus (Cephalochorates). Coxal gland – Arachinds like scropions. Malpighian tubules – Insects. Green gland – Crustaceans like *prawns*.

NCERT Page no. 291

185. (4)

- Each myosin (thick) filament is also a polymerised protein.
 Many monomeric proteins called meromyosins constitute one thick filament.
- Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter, the light meromyosin (LMM).
- The HMM component, i.e.; the head and short arm projects outwards at regular distance and angle from each other from the surface of a polymerized myosin filament and is known as cross arm.
- The globular head is an active ATPase enzyme and has binding sites for ATP and active sites for actin.

186. (1) Some amount of urea many be retained in the kidney matrix to maintain the desired osmolarity.NCERT Page no. 294

187. (4)

Smooth muscles help in transportation of food through digestive tract, the transfer of gametes through the genital tract, and in the process micturition by the urinary bladder.

NCERT Page no. 303

188. (2)

Ultrafiltration – Malpighian Corpuscle Concentration of urine – Loop of Henle Transport of urine – Ureter Storage of urine – Urinary bladder.

NCERT Page no. 293

189. (1)

Streaming of protoplasm is a simple form of movement.

NCERT Page no. 303

190. (3)

Each muscle fibre is lined by the plasma membrane called sarcolemma.

NCERT Page no. 304

191. (4)

Conceptual question.

NCERT Page no. 291

192. (2)

Ciliary movement occurs in most of our internal tubular organs which are lined by ciliated epithelium.

The coordinated movements of cilia in the trachea help us in removing dust particles and some of the foreign substances inhaled along with the atmospheric air.

The passage of ova through the female reproductive tract is also facilitated by the ciliary movement.

NCERT Page no. 303

193. (4)

Actin filaments are thinner as compared to the myosin filaments, hence are commonly called thin and thick filaments respectively. In the centre of each 'I' band is an elastic fibre called 'Z' line which bisects it.

The thin filaments are firmly attached to the 'Z' line.

The portion of the myofibril between two successive 'Z' lines is considered as the functional unit of contraction and is called a sarcomere.

In a resting state, the edges of thin filaments on either side of the thick filaments partially overlap the free ends of the thick filaments leaving the central part of the thick filaments.

This central part of thick filament, not overlapped by thin filaments is called the 'H' zone.

NCERT Page no. 306

194. (2)

Podocytes are the special type of cells present in the visceral layer of Bowman's capsule. These cells have the foot-like processes called pedicels.

NCERT Page no. 293

195. (2)

Glomerulus ↓ Bowman's capsule ↓ Proximal convoluted tubule ↓ Henle's loop ↓ Distal convoluted tubule ↓ Collecting duct.

NCERT Page no. 293

196. (1)

The bones of the hand (fore limb) are humerus, radius and ulna, Carpals (wrist bones – 8 in number). Metacarpals (palm bones – 5 in number) Phalanges (digits – 14 in number). Femur (thigh bone – the longest bond), tibia and fibula. Tarsals (ankle bones – 7 in number). Metatarsals (5 in number) and Phalanges (digits – 14 in number) are the bones of the legs (hind limb).

NCERT Page no. 311

197. (2)

Afferent arteriole is thicker and have greater diameta than efferent arteriole which helps in the ultrafiltration process.

NCERT Page no. 293

198. (4)

Filtration of blood takes place at malpighian body. Malpighian body or corpuscle comprises of glomerulus and Bowman's capsule. Filtration of blood takes place in glomerulus through glomerular filtration:

NCERT Page no. 293

199. (4)

Macrophages and leucocytes exhibit amoemboid movement.

NCERT Page no. 303

200. (2)

Inside the kidney, there are two zones, an outer cortex and an inner medulla.

Inside the kidney the cortical region extends in between the medullary pyramids as renal columns are called column of Bertini, not as renal pelvis.

NCERT Page no. 292