

BOTANY

SECTION A

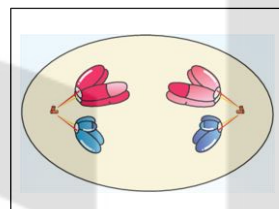
101. **Statement 1.** During the synthesis phase of the cell cycle number of chromosomes per cell doubles.

Statement 2. In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm.

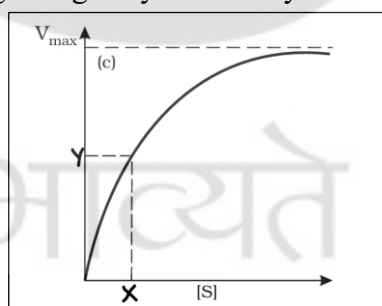
Select the correct statement using the options below:

- Both 1 and 2
 - Only 1
 - Only 2
 - None of these
102. The following image shows which stage of cell division.

- Metaphase I
- Anaphase II
- Telophase I
- Anaphase I

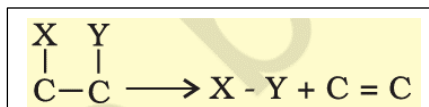


103. Which of the following statements is incorrect?
- Meiosis II is initiated immediately after cytokinesis, usually after the chromosomes have fully elongated.
 - Anaphase II begins with the simultaneous splitting of the centromere of each chromosome.
 - Meiosis increases the genetic variability in the population of organisms from one generation to the next.
 - Microtubules from opposite spindle poles get attached to the kinetochores of sister chromatids in metaphase II.
104. Consider the following image regarding enzyme activity and select the correct answer for X and Y.



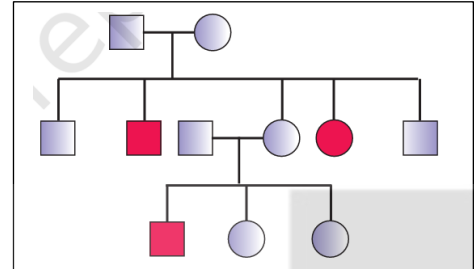
- $X - K_m/4, Y - V_{min}/4$
 - $X - K_m/2, Y - V_{max}/2$
 - $X - K_m, Y - V_{max}/2$
 - $X - K_{min}, Y - V_{min}$
105. The following reaction is performed by which category of enzyme.

- Transferases
- Ligases
- Dehydrogenases
- Lyases



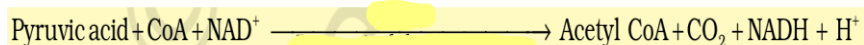
106. Statement 1. NAD and NADP contain the vitamin niacin.
Statement 2. Co-factor removal from an enzyme leads to a loss in the enzyme's catalytic activity.
Select the correct option using the code below:
a. Only 1 is correct.
b. Both 1 and 2 are correct.
c. Only 2 is correct.
d. None of these.
107. Cell plate grows from
a. Wall toward the center
b. Center toward walls
c. One wall to another
d. Simultaneously from the walls toward the center
108. The extinction of passenger pigeons was due to:
a. Habitat loss
b. Over-exploitation
c. Alien species invasions
d. Co-extinctions
109. Which pair is incorrectly matched?
a. *Lantana* – carrot grass
b. African catfish – *Clarias gariepinus*
c. *Eichhornia* – water hyacinth
d. 'Rivet popper hypothesis' – Paul Ehrlich
110. In the species-area relationship equation, the value of "Z" lies in the range of regardless of taxonomic group or area. The equation is given below.
a. 0.1 to 0.2
b. 0.01 to 0.02
c. 1.0 to 2.0
d. 2.0 to 4.0
- $$\log S = \log C + Z \log A$$
111. Which stage of meiosis is characterized by the appearance of recombination nodules?
a. Zygotene
b. Diplotene
c. Pachytene
d. Diakinesis
112. India's share of the global species diversity is:
a. 2.4 percent
b. 12 percent
c. 8.1 percent
d. 22 percent
113. Assertion (A): X-shaped structures called chiasmata can be observed during meiosis.
Reason (R): It can be seen clearly during the pachytene stage of the cell cycle.
a. Both A and R are correct, and R is not the correct explanation of A.
b. Both A and R are correct, and R is the correct explanation of A.
c. Both A and R are incorrect.

- d. Only R is correct.
114. The term biodiversity is popularized by:
- Earnst Haeckel
 - Mayr
 - E. Wilson
 - Robert May
115. The following pedigree chart shows the disorder:
- Colour Blindness
 - Haemophilia
 - Thalassemia
 - Myotonic dystrophy
116. Gibberellins-producing fungi belong to?
- Phycomycetes
 - Ascomycetes
 - Basidiomycetes
 - Deuteromycetes
117. Statement 1. Polyploid condition is often seen in plants.
Statement 2. Failure of cytokinesis after the telophase stage of cell division results in an increase in a whole set of chromosomes in an organism.
Select the correct option using the code below:
- Both statements 1 and 2 are correct and 2 is the correct explanation of 1.
 - Both statements 1 and 2 are correct and 2 is not the correct explanation of 1.
 - Both statements 1 and 2 are incorrect
 - Only 2 is correct.
118. Many “loops” on fingertips can be seen in the case of:
- Turner’s Syndrome
 - Down’s Syndrome
 - Klinefelter’s Syndrome
 - Patau’s Syndrome
119. Assertion (A): In Sickle-cell anaemia - The shape of the RBC changes from a biconcave disc to an elongated sickle-like structure.
Reason (R): The mutant hemoglobin molecule undergoes depolymerization under low oxygen tension.
Select the correct option using the code below:
- Both A and R are true, and R is the correct explanation of A.
 - Both A and R are true, and R is not the correct explanation of A.
 - Only A is true, and R is not true.
 - Only A is not true, and R is true.
120. The monohybrid genotypic ratio 1:2:1 in F₂ generation indicates:
- Segregation
 - Independent assortment
 - Dominance
 - Incomplete dominance



121. Find the correct statement.
- In a large number of insects, the mechanism of sex determination is of the XO type.
 - Grasshopper is an example of a ZW type of sex determination where females have a pair of Z-chromosomes.
 - Birds show male heterogamety.
 - Workers and male honeybees are produced using parthenogenesis.
122. Who explained Mendel's law by using the behavior of chromosomes?
- Carl Correns
 - Alfred Sturtevant
 - Sutton and Boveri
 - T.H. Morgan
123. Statement 1. The RNA polymerase is only capable of catalyzing the process of elongation.
Statement 2. The association of factor σ and factor ρ with RNA polymerase alters the specificity of RNA polymerase.
Select the correct option using the code below:
- Only 1
 - Only 2
 - Both 1 and 2
 - None of these
124. Find the incorrect pair.
- Coding sequences – exons
 - Monocistronic – eukaryotes
 - snRNAs – RNA polymerase I
 - Capping – 5'-end of hnRNA
125. Ribosomes consist of:
- Structural RNAs and 80 different proteins.
 - Structural tRNA and 80 different proteins.
 - Structural RNAs and 20 different proteins.
 - Structural tRNAs and 20 different proteins.
126. Which of the following is correct?
- Only galactose is the monomer unit of lactose sugar.
 - Inulin is the disaccharide of fructose.
 - Sucrose is the disaccharide of glucose and fructose.
 - Starch and cellulose give the positive iodine test.
127. Feathery stigma can be found in which family:
- Leguminosae
 - Malvaceae
 - Poaceae
 - Cruciferae

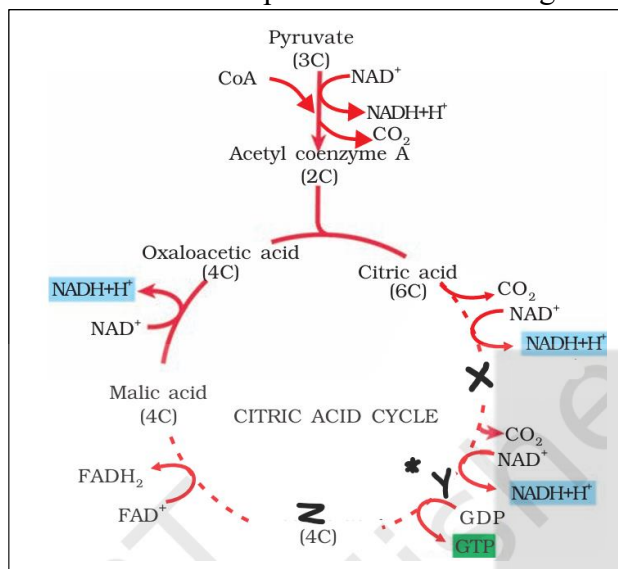
128. It is a proteinaceous layer and the outer covering of the endosperm which separates the embryo. Identify the layer.
- Tegmen
 - Scutellum
 - Hyaline layer
 - Aleurone layer
129. Phellogen and phellem respectively denote.
- Cork and cork cambium
 - Cork cambium and cork
 - Secondary cortex and cork
 - Cork and secondary cortex
130. How many codons in the genetic code that codes for Leucine (Leu) and Serine (Ser) amino acids?
- 4, 6 respectively.
 - 2, 4 respectively.
 - 6, 6 respectively.
 - 4, 4 respectively.
131. Dikaryon formation is the characteristic feature of:
- Ascomycetes and basidiomycetes.
 - Phycomycetes and basidiomycetes.
 - Ascomycetes and phycomycetes.
 - Phycomycetes and zygomycetes.
132. Which technique you have read is used to separate leaf pigments of green plants:
- Column chromatography
 - Paper chromatography
 - Electrophoresis
 - Radioisotopes
133. Statement 1. In the Calvin cycle carboxylation is the fixation of CO_2 into an unstable 3-carbon organic intermediate.
Statement 2. The binding of PEPcase with CO_2 in C_4 plants is competitive.
Select the correct statement using the code below.
- Only 1
 - Both 1 and 2
 - Only 2
 - None of these
134. The following reaction is performed in the presence of:



- Pyruvate decarboxylase and Mg^{2+}
- Pyruvate dehydrogenase and Mn^{2+}
- Pyruvate dehydrogenase and Mg^{2+}
- Pyruvate decarboxylase and Mn^{2+}

135. Given below is Kreb's cycle. Find the name of the compound "Y" in the image using the code below.

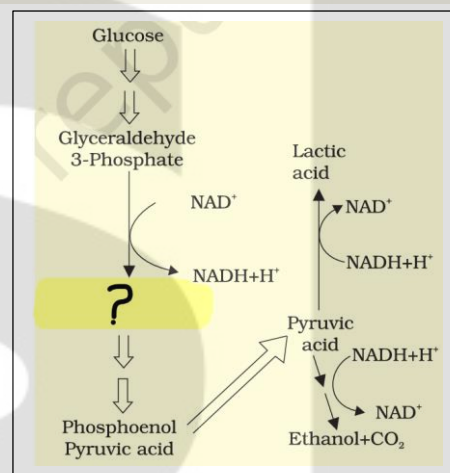
- Succinic acid
- Succinyl-CoA
- α -ketoglutaric acid
- Isocitrate



SECTION B

136. The "?" mark in the image correctly represents:

- 2-phosphoglycerate
- 3-phosphoglyceric acid
- Dihydroxy acetone phosphate
- 1,2-bisphosphoglyceric acid

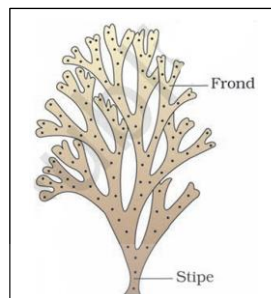


137. Which of the following statements is incorrect?
- Occurrence of more than one seed in an embryo is referred to as polyembryony.
 - Phenomenon of apomixis can be observed in Asteraceae and grasses.
 - Examples of polyembryony are Mango and Citrus.
 - Orobanche* and *Striga* are parasitic plant species.
138. In the grass family, the cotyledon is called:
- Scutellum
 - Coleorhiza
 - Coleoptile
 - Perisperm
139. Statement 1. The "lac operon" can be regulated positively and negatively.
Statement 2. Regulation of "lac operon" by repressor is referred to as negative regulation.
Select the correct statement using the code below:

- a. Only 1
- b. Only 2
- c. Both 1 and 2
- d. None of these

140. Select the correct name of the given image.

- a. *Porphyra*
- b. *Fucus*
- c. *Polysiphonia*
- d. *Ulothrix*

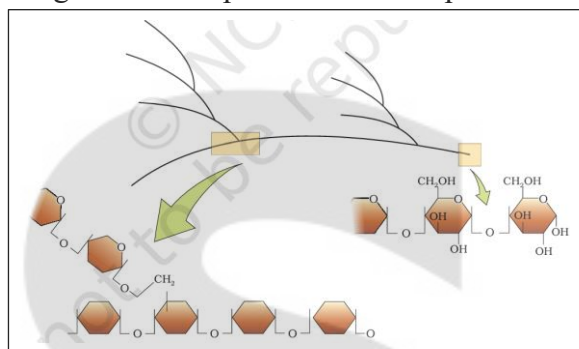


141. Fungi can be coprophilous. It means:

- a. They can grow on dead corps.
- b. They can grow on copper.
- c. They can grow on dung.
- d. Coprolagena is the name of an insect on which fungi can grow.

142. The image given below is a diagrammatic representation of a portion of the:

- a. Cellulose
- b. Starch
- c. Glycolipid
- d. Glycogen



143. Statement 1. The name chromatin (material of the nucleus) is given by Flemming.
Statement 2. Chromatin can be stained by the basic dyes.
Select the correct statement using the code below:

- a. Only 1
- b. Only 2
- c. Both 1 and 2
- d. None of these

144. Which of the following statements is true regarding the Mitotic Metaphase and Metaphase I of Meiosis respectively?

- a. Two rows of chromosomes at the equator in both cases.
- b. Two rows and one row of chromosome at the equator respectively
- c. One row and two rows of chromosomes at the equator respectively
- d. One row of chromosomes at the equator in both cases.

145. Which of the following is a mobile carrier in the ETS of Mitochondria?

- a. Cytochrome a
- b. Cytochrome c
- c. Ubiquinone
- d. Cytochrome C₁

146. Assertion (A): Predators help in maintaining species diversity in a community.
Reason (R): Predators reduce the intensity of competition among competing prey species.
Select the correct option using the code below:
- Both A and R are correct, and R is the correct explanation of A.
 - Both A and R are correct, and R is not the correct explanation of A.
 - A is correct, and R is incorrect.
 - A is incorrect, and R is correct.
147. Statement 1. The standing crop is measured as the mass of living organisms.
Statement 2. The number of trophic levels in the grazing food chain is restricted.
Statement 3. The pyramid of biomass in the sea is generally inverted.
Select the correct option from the given codes below:
- Only 3
 - Only 1 and 2
 - Only 1
 - All of these
148. Statement 1. Morgan coined the term linkage to describe the physical association of genes on a chromosome.
Statement 2. Morgan's student Alfred Sturtevant used the term recombination to describe the generation of non-parental gene combinations.
Select the incorrect statement using the code below:
- Only 1
 - Only 2
 - Both 1 and 2
 - None of these
149. Which of the following is a female gametophyte?
- Ovule
 - Embryo sac
 - Egg
 - Egg apparatus
150. Consider the following statements.
- ABA acts as an antagonist to ethylene.
 - Ethylene is also called stress hormone.
 - Cytokinins promote nutrient mobilization which helps in the delay of leaf senescence.
 - 2, 4-D is a natural auxin that kills dicotyledonous weeds.
- Select the incorrect statement/s using the options below:
- Only I, II, and III
 - Only II, III, and IV
 - Only I, and II
 - Only I, II, and IV

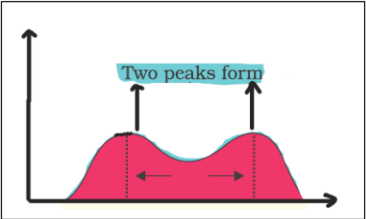
ZOOLOGY

SECTION A

151. Statement 1. Acquired immunity is pathogen specific.
Statement 2. Acquired immunity is characterized by memory.
Select the correct statement using the options given below:
- Only 1
 - Only 2
 - Both 1 and 2
 - None of these
152. Identify the site where *Wuchereria bancrofti* is normally found on the human body.
- Lymphatic vessels of the lower limbs
 - Muscles of the legs
 - Blood vessels of the thigh region
 - In the skin between the fingers
153. Trichoderma is:
- A mycorrhiza
 - A fungus
 - An algae
 - A bacterium
154. Which of the following fungi form a symbiotic association with plants?
- Albugo
 - Glomus
 - Puccinia
 - Lichen
155. After birth, colostrum is released from mammary glands which is rich in
- Fat and low in proteins
 - Proteins and low in fat
 - Proteins, antibodies, and low in fat
 - Proteins, fat, and low in antibodies
156. The secretions of which gland helps in the lubrication of the penis.
- Prostate
 - Glans penis
 - Seminal vesicle
 - Bulbourethral gland
157. During pregnancy corpus luteum:
- Degenerates.
 - Changes to corpus albicans.
 - Persists until parturition.
 - Persists up to the middle of pregnancy.
158. Which of the following occurs due to ADH deficiency?
- Increase urine output.

- b. Increased water in urine.
 - c. Less urine.
 - d. No urination.
159. The nerves carrying impulses to the CNS are known as:
- a. Motor
 - b. Efferent
 - c. Afferent
 - d. Mixed
160. Which of the following statements is correct?
- a. Electrical synapses are more common in our neural system than chemical synapses.
 - b. The new potential in post-synaptic neurons may be either excitatory or inhibitory.
 - c. The Hypothalamus is the major coordination center for sensory and motor signaling.
 - d. The tracts of nerve fibers that connect two cerebral hemispheres are called corpora quadrigemina.
161. Statement 1. Gap junctions in animal cells can be equated with plasmodesmata in plants.
Statement 2. Adipose tissue is a type of loose connective tissue.
Select the correct statement/s using the options below:
- a. Both 1 and 2
 - b. Only 2
 - c. Only 1
 - d. None of these
162. Tendons and ligaments are the examples of:
- a. Areolar connective tissue
 - b. Dense irregular connective tissue
 - c. Dense regular connective tissue
 - d. Loose connective tissue
163. Find the correct statement.
- a. Ramapithecus was more man-like while Dryopithecus was more ape-like.
 - b. Ramapithecus was more ape-like while Dryopithecus was more man-like.
 - c. Both Ramapithecus and Dryopithecus were man-like.
 - d. Both Ramapithecus and Dryopithecus were ape-like.
164. Assertion (A): A sigmoid curve is obtained when the percentage saturation of hemoglobin with O₂ is plotted against the pO₂.
Reason (R): Every 100 mL of oxygenated blood can deliver around 15 mL of O₂ to the tissues under normal physiological conditions.
Select the most appropriate option:
- a. If both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
 - b. If both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
 - c. If Assertion is true, but Reason is false.

- d. If both Assertion and Reason are false.
165. Which of the following pairs is incorrect regarding phylum Mollusca?
- Symmetry – Bilateral
 - Body segmentation – Present with head, muscular foot, and visceral hump.
 - Digestive system – Complete
 - Rasping organ – Radula
166. Find an incorrect match.
- Ophiura* – Brittle star
 - Aplysia* – Sea hare
 - Limulus* – Living fossil
 - Scoliodon* – Cycloid scales
167. Find the incorrect statement about fimbriae in the female reproductive structure.
- Help in the collection of the ovum after ovulation.
 - It's part of the infundibulum.
 - Finger-like projections.
 - It is the last part of the oviduct.
168. Statement 1. The hymen is part of the female external genitalia.
Statement 2. The clitoris is a tiny finger-like structure that lies at the upper junction of the two labia minora.
Select the correct statement/s using the options below:
- Both 1 and 2
 - Only 2
 - Only 1
 - None of these
169. The pulmonary vein, carrying oxygenated blood, opens into:
- Left auricle.
 - Right auricle
 - Left ventricle.
 - Right ventricle
170. Statement 1. The spermatids are transformed into spermatozoa by a process called spermiation.
Statement 2. Oogenesis starts at the age of puberty.
Statement 3. The sperm head is filled with acids that help fertilization of the ovum.
Select the correct statement/s using the options below:
- Only 3
 - Only 2
 - Only 1
 - None of these
171. Cardiac output is/are:
- Product of heart rate and stroke volume.
 - Product of auricular and ventricular volume.
 - A process in which blood is pumped in one minute.
- Select the correct statement/s using the options below:
- Only I

- b. Only II
c. Both I and II
d. Both I and III
172. Juxta-glomerular apparatus is formed by cellular modification in the:
a. Afferent arteriole and DCT
b. Efferent arteriole and PCT
c. Afferent arteriole and PCT
d. Efferent arteriole and DCT
173. In the image given below the process of natural selection is:
a. Directional
b. Disruptive
c. Stabilizing
d. None of these
- 
174. Which of the following statements is incorrect?
a. Counter-current flow of blood in the vasa recta helps to retain the reabsorbed sodium in the renal medulla.
b. Glomerular filtrate is protein-free plasma.
c. Vasa recta carries glomerular filtrate from the distal convoluted tubule to the collecting duct.
d. Glomerular filtrate in Bowman's capsule is isotonic to the plasma.
175. A-band of the myofibril contains:
a. Only thick filaments
b. Only thin filaments
c. Both thick and thin filaments
d. No filaments
176. Which of the following is not part of the axial skeleton?
a. Sacrum
b. Sternum
c. Mandible
d. Humerus
177. Assertion (A): Amniocentesis is often misused.
Reason (R): Amniocentesis is meant to determine the genetic disorders in the fetus.
Select the most appropriate option:
a. If both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
b. If both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
c. If Assertion is true, but Reason is false.
d. If both Assertion and Reason are false.
178. Select the correct match from the given option.
a. Non-Medicated IUDs - Multiload 375
b. Saheli - Contains a non - steroidal preparation.

- c. Lactational amenorrhea - Presence of menstruation
 d. Diaphragms, cervical caps, vaults - Cover the cervix after the coitus is done.
179. Assertion (A): Biopesticides help in overcoming the disadvantages of chemical pesticides.
 Reason (R): Biopesticides are completely harmless to humans and the Environment.
 Select the most appropriate option:
- a. If both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
 b. If both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
 c. If Assertion is true, but Reason is false.
 d. If both Assertion and Reason are false.
180. EcoRI enzymes belong to a larger class of enzymes, which is called:
- a. Ligases
 b. Kinases
 c. Nucleases
 d. Polymerases
181. In agarose gel electrophoresis:
- a. DNA migrates towards the negative electrode.
 b. Supercoiled plasmids migrate slower than their nicked counterparts.
 c. Larger molecules migrate faster than smaller molecules.
 d. Ethidium bromide can be used to visualize the DNA.
182. Acetabulum cavity is found in:
- a. Pelvic girdle
 b. Scapula
 c. Pectoral girdle
 d. Sternum
183. Consider the following match:
- | Column – I | Column – II |
|--------------------|---------------------------------|
| A. Echinodermata | I. Ascidia, Doliolum |
| B. Hemichordata | II. Asterias, Ophiura |
| C. Urochordata | III. Branchiostoma |
| D. Cephalochordata | IV. Balanoglossus, Saccoglossus |
- Match correctly and select the correct option using the code below:
- a. A – IV; B – II; C – I; D – III
 b. A – II; B – IV; C – I; D – III
 c. A – II; B – IV; C – III; D – I
 d. A – II; B – I; C – IV; D – III
184. Statement 1. The tertiary follicle changes into the Graafian follicle.
 Statement 2. The primary oocyte forms a new membrane called zona pellucida and converts it into the secondary oocyte.
 Statement 3. The Graafian follicle goes for ovulation.
 Select the correct statement/s using the options below:

- a. Only 3
- b. Only 1 and 2
- c. Only 1 and 3
- d. All 1, 2, and 3

185. Assertion (A): A cerebellum is related to skillful voluntary movement and involuntary activity like body balance, equilibrium, etc.

Reason (R): It is part of the hindbrain, and it is situated behind the pons.

Select the most appropriate option:

- a. If both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
- b. If both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
- c. If Assertion is true, but Reason is false.
- d. If both Assertion and Reason are false.

SECTION B

186. Golden rice is rich in:

- a. Vitamin A
- b. Iron
- c. Iodine
- d. Protein

187. Find the wrong match:

- a. Lepidopterans - tobacco budworm
- b. Dipterans – beetles
- c. Coleopterans – armyworm
- d. Both b and c

188. Assertion (A): Atrial natriuretic factor (ANF) increases blood pressure when GFR is low.

Reason (R): The atrial wall of our heart secretes ANF which causes constriction of the blood vessels.

Select the most appropriate option:

- a. If both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
- b. If both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
- c. If Assertion is true, but Reason is false.
- d. If both Assertion and Reason are false.

189. Statement 1. Unmyelinated nerve fibres are commonly found in autonomous and somatic neural systems.

Statement 2. Myelinated nerve fibres are found in spinal and cranial nerves.

Select the correct statement/s using the options below:

- a. Both 1 and 2
- b. Only 2

- c. Only 1
d. None of these
190. Statement 1. Ear Ossicles are part of the external and middle ear.
Statement 2. A single U-shaped bone called a hyoid is present at the base of the buccal cavity.
Select the correct statement/s using the options below:
a. Both 1 and 2
b. Only 2
c. Only 1
d. None of these
191. Which set identifies striated muscles?
a. Cylindrical, Syncytial, and Unbranched
b. Spindle, Unbranched and Uninucleated
c. Cylindrical, Striped, and Nucleated
d. Cylindrical, Striped, and Branched
192. Which of the following is correct?
a. There are 2 floating ribs in our body.
b. Tarsals have 8 bones in number.
c. Acromion process is part of clavicle bone.
d. Fibrous joints do not allow any movement.
193. A patient was diagnosed that one process of his excretory system was not functioning properly due to which his urine is not concentrating.
Identify the organ of the excretory system on which concentration of urine depends.
a. Collecting duct
b. Bowman's capsule
c. Length of the loop of Henle
d. Proximal convoluted tubules
194. Which one of the following describes correctly the homologous structures?
a. Organs that have no function now but have an important function in ancestors.
b. Organs appear only in the embryonic stage and disappear later in the adult.
c. Organs with anatomical similarities but performing different functions.
d. Organs with anatomical dissimilarities but performing the same function.
195. Statement 1. Glucagon stimulates glycogenolysis in our body by acting on liver cells.
Statement 2. Islet of Langerhans of the liver secretes glucagon.
Statement 3. Glucagon is a steroid hormone while insulin, a peptide hormone.
Select the correct statement/s using the options below:
a. Only 1
b. Only 1 and 2
c. Only 2 and 3
d. All 1, 2, and 3

196. Statement 1. Cortisol is the main glucocorticoid.
Statement 2. Glucocorticoids inhibit cellular uptake and utilization of amino acids.
Select the correct statement/s using the options below:
- Both 1 and 2
 - Only 2
 - Only 1
 - None of these
197. Statement 1. Progesterone hormone is essential for the maintenance and disintegration of the endometrium.
Statement 2. The disintegration of the endometrium marks that pregnancy has established.
Select the correct statement/s using the options below:
- Both 1 and 2
 - Only 2
 - Only 1
 - None of these
198. Statement 1. Infection of plasmodium is associated with the release of a toxic substance, hemozoin.
Statement 2. Plasmodium sporozoites are stored in the female anopheles' salivary glands.
Select the correct statement/s using the options below:
- Both 1 and 2
 - Only 1
 - Only 2
 - None of these
199. Statement 1. The unipolar neuron is found in the retina of our eye.
Statement 2. Multipolar neurons are characteristics of the cerebellar cortex.
Select the correct statement/s using the options below:
- Both 1 and 2
 - Only 1
 - Only 2
 - None of these
200. Assertion (A): Chondrichthyes fishes need to swim constantly.
Reason (R): These fishes possess a special air bladder that helps them to swim.
Select the most appropriate option:
- If both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
 - If both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
 - If Assertion is true, but Reason is false.
 - If both Assertion and Reason are false.