

101. Which one of the following has an open circulatory system?  
(1) *Hirudinaria*                      (2) *Octopus*  
(3) *Pheretima*                        (4) *Periplaneta*
102. Withdrawal of which of the following hormones is the immediate cause of menstruation?  
(1) FSH-RH                              (2) Progesterone  
(3) Estrogen                              (4) FSH
103. Which one of the following statements is incorrect?  
(1) In insects, circulating body fluids serve to distribute oxygen to tissues  
(2) The principle of countercurrent flow facilitates efficient respiration in gills of fishes  
(3) The residual air in lungs slightly decreases the efficiency of respiration in mammals  
(4) The presence of non-respiratory air sacs, increases the efficiency of respiration in birds
104. Which of the following is an accumulation and release centre of neurohormones?  
(1) Hypothalamus  
(2) Anterior pituitary lobe  
(3) Posterior pituitary lobe  
(4) Intermediate lobe of the pituitary
105. The causative agent of mad-cow disease is  
(1) Worm                                      (2) Virus  
(3) Bacterium                                (4) Prion
106. Which hormone causes dilation of blood vessels, increased oxygen consumption and gluconeogenesis?  
(1) Adrenaline                              (2) Glucagon  
(3) ACTH                                      (4) Insulin
107. Restriction endonuclease  
(1) restricts the synthesis of DNA inside the nucleus  
(2) synthesizes DNA  
(3) cuts the DNA molecule randomly  
(4) cuts the DNA molecule at specific sites
108. If a colourblind woman marries a normal visioned man, their sons will be  
(1) three-fourths colourblind and one-fourth normal  
(2) all colourblind  
(3) all normal visioned  
(4) one-half colourblind and one-half normal
109. Antibodies in our body are complex  
(1) prostaglandins                      (2) glycoproteins  
(3) lipoproteins                          (4) steroids
110. Cri-du-chat syndrome in humans is caused by the  
(1) loss of half of the long arm of chromosome 5  
(2) trisomy of 21<sup>st</sup> chromosome  
(3) fertilization of an XX egg by a normal Y-bearing sperm  
(4) loss of half of the short arm of chromosome 5
111. Limit of BOD prescribed by Central Pollution Control Board for the discharge of industrial and municipal waste waters into natural surface waters, is  
(1) < 100 ppm                              (2) < 30 ppm  
(3) < 3.0 ppm                                (4) < 10 ppm
112. Earthworms are  
(1) uricotelic under conditions of water scarcity  
(2) ammonotelic when plenty of water is available  
(3) ureotelic when plenty of water is available  
(4) uricotelic when plenty of water is available
113. Pineapple (annanas) fruit develops from
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127. Which one of the following statements is correct?
- (1) Neither hormones control neural activity nor the neurons control endocrine activity
  - (2) Endocrine glands regulate neural activity, but not vice versa
  - (3) Neurons regulate endocrine activity, but not vice versa
  - (4) Endocrine glands regulate neural activity, and nervous system regulates endocrine glands
128. Examination of blood of a person suspected of having anemia, shows large, immature, nucleated erythrocytes without hemoglobin. Supplementing his diet with which of the following, is likely to alleviate his symptoms?
- (1) Riboflavin
  - (2) Iron compounds
  - (3) Thiamine
  - (4) Folic acid and cobalamine
129. Farmers in a particular region were concerned that pre-mature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield?
- (1) Removal of all yellow leaves and spraying the remaining green leaves with 2, 4, 5-trichlorophenoxy acetic acid
  - (2) Application of iron and magnesium to promote synthesis of chlorophyll
  - (3) Frequent irrigation of the crop
  - (4) Treatment of the plants with cytokinins alongwith a small dose of nitrogenous fertilizer
130. Which one of the following amino-acids was not found to be synthesized experiment?
- (1) Glutamic acid      (2) Alanine
  - (3) Glycine            (4) Aspartic acid
131. In which of the following fruits is the edible part the aril?
- (1) Orange              (2) Litchi
  - (3) Custard apple    (4) Pomegranate
132. People living at sea level have around 5 million RBC per cubic millimeter of their blood whereas those living at an altitude of 5400 metres have around 8 million. This is because at high altitude
- (1) there is more UV radiation which enhances RBC-production
  - (2) people eat more nutritive food, therefore more RBCs are formed
  - (3) people get pollution-free air to breathe and more oxygen is available
  - (4) atmospheric O<sub>2</sub> level is less and hence more RBCs are needed to absorb the required amount of O<sub>2</sub> to survive
133. An important evidence in favour of organic evolution is the occurrence of
- (1) Homologous organs only
  - (2) Homologous and analogous organs
  - (3) Homologous and vestigial organs
  - (4) Analogous and vestigial organs
134. Which one of the following is not a living fossil?
- (1) *Archaeopteryx*      (2) *Peripatus*
  - (3) King crab            (4) *Sphenodon*
135. Annual migration does not occur in the case of
- (1) Salamander            (2) Arctic tern
  - (3) Salmon                (4) Siberian crane
136. A major breakthrough in the studies of cells came with the development of electron microscope. This is because
- (1) electron beam can pass through thick materials, whereas light microscopy requires thin sections
  - (2) the electron microscope is more powerful than the light microscope as it uses a beam of electrons which has wavelength much longer than that of photons
  - (3) the resolution power of the electron microscope is much higher than that of the light microscope
  - (4) the resolving power of the electron microscope is 200 – 350 nm as compared to 0.1 – 0.2 nm for the light microscope

137. Which of the following is a matching set of a phylum and its three examples?
- (1) Mollusca – *Loligo*, *Teredo*, *Octopus*
  - (2) Porifera – *Spongilla*, *Euplectella*, *Pennatula*
  - (3) Cnidaria – *Bonellia*, *Physalia*, *Aurelia*
  - (4) Platyhelminthes – *Planaria*, *Schistosoma*, *Enterobius*
138. Which of the following pairs of an animal and a plant represents endangered organisms in India?
- (1) *Cinchona* and Leopard
  - (2) Banyan and Black buck
  - (3) *Bentinckia nicobarica* and Red Panda
  - (4) Tamarind and Rhesus monkey
139. Jurassic period of the Mesozoic era is characterised by
- (1) Dinosaurs become extinct and angiosperms appear
  - (2) Flowering plants and first dinosaurs appear
  - (3) Gymnosperms are dominant plants and first birds appear
  - (4) Radiation of reptiles and origin of mammal-like reptiles
140. What is common about *Trypanosoma*, *Noctiluca*, *Monocystis* and *Giardia*?
- (1) They produce spores
  - (2) These are all parasites
  - (3) These are all unicellular protists
  - (4) They have flagella
141. Metameric segmentation is the characteristic of
- (1) Annelida and Arthropoda
  - (2) Mollusca and Chordata
  - (3) Platyhelminthes and Arthropoda
  - (4) Echinodermata and Annelida
142. Which of the following statements regarding cilia is not correct?
- (1) Microtubules of cilia are composed of tubulin
  - (2) Cilia contain an outer ring of nine doublet microtubules surrounding two single microtubules
  - (3) The organized beating of cilia is controlled by fluxes of  $Ca^{2+}$  across the membrane
  - (4) Cilia are hair-like cellular appendages
143. Long filamentous threads protruding at the end of a young cob of maize are
- (1) ovaries
  - (2) hairs
  - (3) anthers
  - (4) styles
144. Conifers differ from grasses in the
- (1) absence of pollen tubes
  - (2) formation of endosperm before fertilization
  - (3) production of seeds from ovules
  - (4) lack of xylem tracheids
145. What type of placentation is seen in sweet pea?
- (1) Free central
  - (2) Marginal
  - (3) Basal
  - (4) Axile
146. The thalloid body of a slime mould (*Myxomycetes*) is known as
- (1) Fruiting body
  - (2) Mycelium
  - (3) Protonema
  - (4) Plasmodium
147. In which mode of inheritance do you expect more maternal influence among the offspring?
- (1) Y-linked
  - (2) X-linked
  - (3) Autosomal
  - (4) Cytoplasmic
148. How many different kinds of gametes will be produced by a plant having the genotype AABbCC?
- (1) Nine
  - (2) Two
  - (3) Three
  - (4) Four
149. In maize, hybrid vigour is exploited by
- (1) harvesting seeds from the most productive plants
  - (2) inducing mutations
  - (3) bombarding the protoplast with DNA
  - (4) crossing of two inbred parental lines

150. One gene-one enzyme hypothesis was postulated by
- (1) A. Garrod
  - (2) Beadle and Tatum
  - (3) R. Franklin
  - (4) Hershey and Chase
151. Test cross involves
- (1) Crossing the  $F_1$  hybrid with a double recessive genotype
  - (2) Crossing between two genotypes with dominant trait
  - (3) Crossing between two genotypes with recessive trait
  - (4) Crossing between two  $F_1$  hybrids
152. Antiparallel strands of a DNA molecule means that
- (1) The phosphate groups at the start of two DNA strands are in opposite position (pole)
  - (2) One strand turns clockwise
  - (3) One strand turns anti-clockwise
  - (4) The phosphate groups of two DNA strands, at their ends, share the same position
153. One turn of the helix in a B-form DNA is approximately
- (1) 3.4 nm
  - (2) 2 nm
  - (3) 20 nm
  - (4) 0.34 nm
154. Mast cells secrete
- (1) Histamine
  - (2) Hemoglobin
  - (3) Hippurin
  - (4) Myoglobin
155. Areolar connective tissue joins
- (1) Bones with muscles
  - (2) Bones with muscles
  - (3) Fat body with muscles
  - (4) Integument with muscles
156. Phenotype of an organism is the result of
- (1) Environmental changes and sexual dimorphism
  - (2) Genotype and environment interactions
  - (3) Mutations and linkages
  - (4) Cytoplasmic effects and nutrition
157. Which one of the following is the most suitable medium for culture of *Drosophila melanogaster* ?
- (1) Ripe banana
  - (2) Cow dung
  - (3) Moist bread
  - (4) Agar agar
158. Photochemical smog pollution does not contain
- (1) Carbon dioxide
  - (2) PAN (peroxy acyl nitrate)
  - (3) Ozone
  - (4) Nitrogen dioxide
159. Which antibiotic inhibits interaction between tRNA and mRNA during bacterial protein synthesis ?
- (1) Streptomycin
  - (2) Tetracycline
  - (3) Erythromycin
  - (4) Neomycin
160. Which one of the following is not included under *in-situ* conservation ?
- (1) Biosphere reserve
  - (2) National park
  - (3) Sanctuary
  - (4) Botanical garden
161. Moss peat is used as a packing material for sending flowers and live plants to distant places because
- (1) It reduces transpiration
  - (2) It serves as a disinfectant
  - (3) It is easily available
  - (4) It is hygroscopic
162. A common structural feature of vessel elements and sieve tube elements is
- (1) Presence of p-protein
  - (2) Enucleate condition
  - (3) Thick secondary walls
  - (4) Pores on lateral walls
163. Angiotensinogen is a protein produced and secreted by
- (1) Liver cells
  - (2) Juxtaglomerular (JG) cells
  - (3) Macula densa cells
  - (4) Endothelial cells (cells lining the blood vessels)

164. HIV that causes AIDS, first starts destroying
- (1) Thrombocytes
  - (2) Helper T-lymphocytes
  - (3) B-lymphocytes
  - (4) Leucocytes
165. *Triticale*, the first man-made cereal crop, has been obtained by crossing wheat with
- (1) Sugarcane
  - (2) Barley
  - (3) Rye
  - (4) Pearl millet
166. Both sickle cell anemia and Huntington's chorea are
- (1) Pollutant-induced disorders
  - (2) Virus-related diseases
  - (3) Bacteria-related diseases
  - (4) Congenital disorders
167. In order to obtain virus-free plants through tissue culture the best method is
- (1) Anther culture
  - (2) Meristem culture
  - (3) Protoplast culture
  - (4) Embryo rescue
168. Two common characters found in centipede, cockroach, and crab are
- (1) Green gland and tracheae
  - (2) Book lungs and antennae
  - (3) Compound eyes and anal cerci
  - (4) Jointed legs and chitinous exoskeleton
169. In which one of the following sets of animals do all the four give birth to young ones ?
- (1) Shrew, Bat, Cat, Kiwi
  - (2) Kangaroo, Hedgehog, Dolphin, Loris
  - (3) Lion, Bat, Whale, Ostrich
  - (4) Platypus, Penguin, Bat, Hippopotamus
170. Sickle cell anemia has not been eliminated from the African population because
- (1) It provides immunity against malaria
  - (2) It is controlled by dominant genes
  - (3) It is controlled by recessive genes
  - (4) It is not a fatal disease
171. The translocation of organic solutes in sieve tube members is supported by
- (1) Mass flow involving a carrier and ATP
  - (2) Cytoplasmic streaming
  - (3) Root pressure and transpiration pull
  - (4) P-proteins
172. An enzyme that can stimulate germination of barley seeds is
- (1) Protease
  - (2) Invertase
  - (3)  $\alpha$ -amylase
  - (4) Lipase
173. In a cereal grain the single cotyledon of embryo is represented by
- (1) Prophyll
  - (2) Coleoptile
  - (3) Coleorhiza
  - (4) Scutellum
174. Biradial symmetry and lack of cnidoblasts are the characteristics of
- (1) *Aurelia* and *Paramecium*
  - (2) *Hydra* and starfish
  - (3) Starfish and sea anemone
  - (4) *Ctenoplana* and *Beroe*
175. The arrangement of the nuclei in a normal embryo sac in the dicot plants is
- (1) 2 + 3 + 3
  - (2) 3 + 3 + 2
  - (3) 2 + 4 + 2
  - (4) 3 + 2 + 3
176. The majority of carbon dioxide produced by our body cells is transported to the lungs
- (1) as carbonates
  - (2) attached to hemoglobin
  - (3) Dissolved in the blood
  - (4) As bicarbonates
177. A person showing unpredictable moods, outbursts of emotion, quarrelsome behaviour and conflicts with others is suffering from
- (1) Mood disorders
  - (2) Addictive disorders
  - (3) Schizophrenia
  - (4) Borderline personality disorder (BPD)

178. Sulphur is an important nutrient for optimum growth and productivity in  
 (1) Fibre crops (2) Oilseeds crops  
 (3) Pulse crops (4) Cereals
179. Pentamerous actinomorphic flowers, bicarpellary ovary with oblique septa, and fruit a capsule or berry, are characteristic features of  
 (1) Solanaceae (2) Liliaceae  
 (3) Asteraceae (4) Brassicaceae
180. Which one of the following is the correctly matched pair of an endangered animal and a National Park?  
 (1) Wild ass – Dudhwa National Park  
 (2) Great Indian Bustard – KeoIadeo National Park  
 (3) Lion – Corbett National Park  
 (4) Rhinoceros – Kaziranga National Park
181. In a moss the sporophyte  
 (1) Arises from a spore produced form the gametophyte  
 (2) Manufactures food for itself, as well as for the gametophyte  
 (3) Is partially parasitic on the gametophyte  
 (4) Produces gametes that give rise to the gametophyte
182. Curing of tea leaves is brought about by the activity of  
 (1) Viruses (2) Fungi  
 (3) Bacteria (4) Mycorrhiza
183. Which of the following statements regarding mitochondrial membrane is not correct ?  
 (1) The inner membrane is highly convoluted forming a series of infoldings  
 (2) The outer membrane resembles a sieve  
 (3) The outer membrane is permeable to all kinds of molecules  
 (4) The enzymes of the electron transfer chain are embedded in the outer membrane
184. How many ATP molecules could maximally be generated from one molecule of glucose, if the complete oxidation of one mole of glucose of  $\text{CO}_2$  and  $\text{H}_2\text{O}$  yields 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal?  
 (1) Fifty-seven (2) One  
 (3) Two (4) Thirty
185. An organic substance bound to an enzyme and essential for its activity is called  
 (1) Apoenzyme (2) Isoenzyme  
 (3) Coenzyme (4) Holoenzyme
186. Bowman's glands are found in  
 (1) Cortical nephrons only  
 (2) Juxtamedullay nephrons  
 (3) Olfactory epithelium  
 (4) External auditory canal
187. The bacterium (*Clostridium botulinum*) that causes botulism is  
 (1) a facultative aerobe  
 (2) an obligate aerobe  
 (3) a facultative anaerobe  
 (4) an obligate anaerobe
188. Amino acid sequence, in protein synthesis is decided by the sequence of  
 (1) cDNA (2) rRNA  
 (3) tRNA (4) mRNA
189. Evolutionary history of an organism is known as  
 (1) Paleontology (2) Ontogeny  
 (3) Phylogeny (4) Ancestry
190. Which of the following environmental conditions are essential for optimum growth of *Mucor* on a piece of bread ?  
 A. Temperature of about 25°C  
 B. Temperature of about 5°C  
 C. Relative humidity of about 5%  
 D. Relative humidity of about 95%  
 E. A shady place  
 F. A brightly illuminated place
- Choose the answer from the following options  
 (1) B, D and E only  
 (2) B, C and F only  
 (3) A, C and E only  
 (4) A, D and E only

191. Which of the following is considered a hot-spot of biodiversity in India ?
- (1) Eastern Ghats
  - (2) Aravalli Hills
  - (3) Western Ghats
  - (4) Indo-Gangetic Plain
192. Two microbes found to be very useful in genetic engineering are
- (1) *Diplococcus* sp. and *Pseudomonas* sp.
  - (2) Crown gall bacterium and *Caenorhabditis elegans*
  - (3) *Escherichia coli* and *Agrobacterium tumefaciens*
  - (4) *Vibrio cholerae* and a tailed bacteriophage
193. Which one of the following is an example of polygenic inheritance ?
- (1) Pod shape in garden pea
  - (2) Skin colour in humans
  - (3) Flower colour in *Mirabilis jalapa*
  - (4) Production of male honey bee
194. During photorespiration, the oxygen consuming reaction(s) occur in
- (1) Grana of chloroplasts and peroxisomes
  - (2) Stroma of chloroplasts
  - (3) Stroma of chloroplasts and mitochondria
  - (4) Stroma of chloroplasts and peroxisomes
195. The contractile protein of skeletal muscle involving ATPase activity is
- (1)  $\alpha$ -Actinin
  - (2) Troponin
  - (3) Tropomyosin
  - (4) Myosin
196. Sertoli cells are regulated by the pituitary hormone known as
- (1) Prolactin
  - (2) LH
  - (3) FSH
  - (4) GH
197. A steroid hormone which regulates glucose metabolism is
- (1) 11-dexycorticosterone
  - (2) Cortisone
  - (3) Cortisol
  - (4) Corticosterone
198. Which one of the following is not a second messenger in hormone action ?
- (1) Sodium
  - (2) cAMP
  - (3) cGMP
  - (4) Calcium
199. Which one of the following does not act as a neurotransmitter ?
- (1) Neropinephrine
  - (2) Cortisone
  - (3) acetylcholine
  - (4) Epinephrine
200. In Mendel's experiments with garden pea, round seed shape (RR) was dominant over wrinkled seeds (rr), yellow cotyledon (YY) was dominant over green cotyledon (yy). What are the expected phenotypes in the  $F_2$  generation of the cross  $RRYY \times rryy$  ?
- (1) Only wrinkled seeds with green cotyledons
  - (2) Round seeds with yellow cotyledons and wrinkled seeds with yellow cotyledons
  - (3) Only round seeds with green cotyledons
  - (4) Only wrinkled seeds with yellow cotyledons

### SOLUTION

- Sol: Ans [4]** Open circulatory system is a characteristic feature of Arthropods.
- Sol: Ans [2]** If the ovum is not fertilized about 2 days before the end of monthly cycle, the corpus luteum in ovary suddenly involutes, and the ovarian hormone progesterone decreases to low level of secretion.
- Sol: Ans [1]** Respiration in insects takes place by tracheal system.
- Sol: Ans [3]** Hypothalamus releases the neurohormones which are accumulated in posterior lobe of pituitary.
- Sol: Ans [4]** Prions are proteinaceous infectious particles, subviral entities devoid of their own genetic material.
- Sol: Ans [1]** Adrenaline increases the metabolic rate of whole body, thus increasing glycogenolysis in liver and muscle and releases glucose into blood.
- Sol: Ans [4]** Restriction endonucleases can break DNA at specific sites. They are appropriately called molecular scissors.
- Sol: Ans [2]**
- Sol: Ans [2]** The antibodies are gamma-globulins and glycoproteins.
- Sol: Ans [4]**
- Sol: Ans [2]** BOD indicates the level of pollution.
- Sol: Ans [2]** Earthworms excrete urea in normal atmospheric conditions but ammonia in scarcity of water.
- Sol: Ans [1]** Pineapple is an example of composite or multiple fruits which develop from different flowers of the inflorescence.
- Sol: Ans [3]** Golden rice is a transgenic plant and it is useful because it is vitamin A rich rice.
- Sol: Ans [4]** Aleurone layer is the outer most part of endosperm which is  $3n$ .
- Sol: Ans [4]** When the apical bud is removed by pruning, the lateral buds sprout.
- Sol: Ans [4]** Parthenocarpic fruits are seedless fruits.
- Sol: Ans [2]** Camouflage is resembling surroundings. It is meant for avoiding detection by prey or predator.
- Sol: Ans [4]** Excess nitrate reacts with haemoglobin and produces methaemoglobin which causes blue baby syndrome.
- Sol: Ans [2]** The equation of J-shaped or exponential growth in population is  $\frac{dN}{dt} = rN$  where,  $\frac{dN}{dt}$  is the rate of change in population size,  $r$  is the rate of reproduction while  $N$  is size of population.
- Sol: Ans [4]** Montreal Protocol (16 September 1987) 27 industrialised countries agreed to limit production of chlorofluorocarbons to half the level of 1986.
- Sol: Ans [2]** Croplands are monocultures and lack diversity. They are vulnerable to destruction due to floods, droughts, diseases pathogens and pests. Irish famine and Bengal famine are examples.

**Sol: Ans [1]**

**Sol: Ans [2]** For construction of ecological pyramids fresh weight is not used.

**Sol: Ans [2]** In photosystem-I, the first electron acceptor is an iron-sulphur protein.

**Sol: Ans [2]** One of the ways of artificial overcoming of seed dormancy is stratification or subjecting the moist seeds in presence of oxygen to periods of low temperature.

**Sol: Ans [4]** Nervous system and endocrine system coordinate together.

**Sol: Ans [4]** Megaloblastic anaemia is caused by deficiency of folic acid.

**Sol: Ans [2]** Premature yellowing of leaves is because of non production of chlorophyll, the synthesis of which can be promoted by applying iron and magnesium.

**Sol: Ans [1]**

**Sol: Ans [2]** Litchi is a nut.

**Sol: Ans [4]** At high altitudes the number of RBCs increases.

**Sol: Ans [3]** Homologous organs have same origin whereas vestigial organs indicate the remnants of the ancestors.

**Sol: Ans [1]**

**Sol: Ans [1]** Annual migration does not occur in the case of Salamander.

**Sol: Ans [3]** Low wavelength causes higher resolution in EM.

**Sol: Ans [1]**

**Sol: Ans [3]** *Bentinckia nicobarica* and Red Panda are endangered.

**Sol: Ans [3]**

**Sol: Ans [3]** *Trypanosoma*, *Noctiluca*, *Monocystis* and *Giardia* are all unicellular eukaryotes belonging to kingdom Protista.

**Sol: Ans [1]**

**Sol: Ans [3]**

**Sol: Ans [4]** Long filamentous threads protruding at the end of a young cob of maize are styles.

**Sol: Ans [2]** In conifers (gymnosperm) endosperm develops from megaspores (before fertilisation).

**Sol: Ans [2]** Sweet pea belonging to Fabaceae shows marginal placentation.

**Sol: Ans [4]** The thalloid body of a slime mould is multinucleate without septa formation and is known as plasmodium.

**Sol: Ans [4]** Cytoplasmic inheritance is expected to show more maternal influence.

**Sol: Ans [2]** A plant having genotype AABbCC (heterozygous for only one character) produces two different kinds of gametes.

**Sol: Ans [4]** In maize hybrid vigour is exploited by crossing of two inbred parental lines.

**Sol: Ans [2]** One gene one enzyme hypothesis was postulated by Beadle and Tatum.

**Sol: Ans [1]** Test cross is back cross with a recessive parent. It gives ratio of 1 : 1.

- Sol: Ans [1]** Antiparallel strands of DNA due to reverse orientation of dioxiriboses as a result of which phosphate groups are attached to 3'-5' in other strand.
- Sol: Ans [1]** One turn of the helix in  $\beta$  form is 34 Å i.e., 3.4 nm.
- Sol: Ans [1]** Mast cells secrete histamine which is anti-inflammatory.
- Sol: Ans [4]** Areolar connective tissue contains fibroblasts.
- Sol: Ans [2]** The phenotype of the organism is basically its genotype but the interaction with the environment also effects the phenotype.
- Sol: Ans [1]**
- Sol: Ans [1]** Smog pollution is due to presence of NO<sub>2</sub>, O<sub>3</sub> and PAN.
- Sol: Ans [4]** Neomycin inhibits interaction between tRNA and mRNA during bacterial protein synthesis.
- Sol: Ans [4]** Botanical gardens is meant for *ex situ* conservation and not inside.
- Sol: Ans [4]** Sphagnum i.e., peat moss is hygroscopic and therefore retain plenty of water hence it is used as packing material.
- Sol: Ans [2]** The xylem elements as well as sieve tube elements do not contain nuclei.
- Sol: Ans [1]**
- Sol: Ans [2]**
- Sol: Ans [3]** Wheat is crossed with rye so the drought resistance develops in the progeny i.e., triticale.
- Sol: Ans [4]** Sickle cell anemia and huntington's chorea are the result of mutation of the genes and are therefore hereditary.
- Sol: Ans [2]** The meristematic cells of shoot apex of a virus infected plant is always free from virus.
- Sol: Ans [4]** The characteristic feature of arthropods is exoskeleton and jointed legs.
- Sol: Ans [2]** Placental mammals give birth to young ones.
- Sol: Ans [1]** The malarial parasite cannot survive in RBC which is sickle shape due to scarcity of space.
- Sol: Ans [2]** Cytoplasmic streaming is confirmed to be responsible by directional conduction of organic solutes.
- Sol: Ans [3]** At the time of germination of see the gibberlin activate the gene for the synthesis of  $\alpha$  - amylase.
- Sol: Ans [4]**
- Sol: Ans [4]**
- Sol: Ans [4]** In the embryo sac there are 3 cells at the nuculeophylar towards microphyle and 3 antipedals towards chalazal end.
- Sol: Ans [4]**
- Sol: Ans [4]**
- Sol: Ans [3]** Sulphur rich is a component of cysteine, methionine which are needed in a polypeptide, pulse crops are important for manufacturing protein.
- Sol: Ans [1]**
- Sol: Ans [1]** Wildass is an endangered species in Dudhwa National Park.

- Sol: Ans [3]** In moss the sporophyte has green chlorophyll and stomata therefore they can manufacture food to some extent by themselves.
- Sol: Ans [3]** Curing of the fer leaves is done by a bacterium *Bacillus mejiatherium*.
- Sol: Ans [4]** The enzyme for ETS are located in inner membrane of mitochondria not in outer membrane.
- Sol: Ans [1]** 12 kcal = 1 ATP, hence 686 kcal  $\cong$  57 ATP.
- Sol: Ans [3]** Coenzyme like NAD and FAD bound to an enzyme and essential for its activity.
- Sol: Ans [3]** Bowman's glands are concerned with olfaction.
- Sol: Ans [4]** *C-botulinum* is an obligate anaerobe.
- Sol: Ans [4]** Genetic codes occur in mRNA.
- Sol: Ans [3]** Phylogeny deals with the evolutionary history.
- Sol: Ans [4]** Germination of *Mucor* and its growth requires temperature of 35°C, plenty of water and shady place.
- Sol: Ans [3]** Maximum biodiversity occurs in two hot spots : (i) Western ghat, (ii) Eastern himalays.
- Sol: Ans [3]** *E.coli* and *A. Humifaciens* are widely used in genetic engineering.
- Sol: Ans [2]** Skin colour in human is an example of polygenic inheritance/quantitative inheritance.
- Sol: Ans [4]** Oxygen is required in photorespiration in both chloroplast and peroxysomes.
- Sol: Ans [4]** Myosin and actin are involved in muscle contraction.
- Sol: Ans [3]**
- Sol: Ans [3]**
- Sol: Ans [1]**
- Sol: Ans [2]**
- Sol: Ans [2]** 4-types of progeny are found in F<sub>2</sub> generation of dihybrid including round seeds with yellow cotyledon and wrinkeled seeds with yellow cotyledon.

51. ICBN stands for :
- (1) International Code of Botanical Nomenclature
  - (2) International Congress of Biological Names
  - (3) Indian Code of Botanical Nomenclature
  - (4) Indian Congress of Biological Names
52. Which pair of the following belongs to Basidiomycetes ?
- (1) Puffballs and *Claviceps*
  - (2) *Peziza* and Stink horns
  - (3) *Morchella* and Mushrooms
  - (4) Bird's nest fungi and Puffballs
53. Biological organization starts with :
- (1) Cellular level
  - (2) Organismic level
  - (3) Atomic level
  - (4) Submicroscopic molecular level
54. Identify the *odd* combination of the habitat and the particular animal concerned :
- (1) Sunderbans- Bengal Tiger
  - (2) Periyar- Elephant
  - (3) Rann of Kutch- Wild Ass
  - (4) Dachigam National Park - Snow Leopard
55. If you suspect major deficiency of antibodies in a person, to which of the following would you look for confirmatory evidence ?
- (1) Serum globulins
  - (2) Fibrinogen in the plasma
  - (3) Haemocytes
  - (4) Serum albumins
56. A common test to find the genotype of a hybrid is by
- (1) Crossing of one F<sub>2</sub> progeny with female parent
  - (2) Studying the sexual behaviour of F<sub>1</sub> progenies
  - (3) Crossing of one F<sub>1</sub> progeny with male parent
  - (4) Crossing of one F<sub>2</sub> progeny with male parent
57. The Okazaki fragments in DNA chain growth :
- (1) Polymerize in the 3' - to -5' direction and forms replication fork
  - (2) Prove semi-conservative nature of DNA replication
  - (3) Polymerize in the 5' - to -3' direction and explain 3' - to -5' DNA replication
  - (4) Result in transcription
58. Which one of the following statement is *correct* ?
- (1) There is no evidence of the existence of gills during embryogenesis of mammals
  - (2) All plant and animal cells are totipotent
  - (3) Ontogeny repeats phylogeny
  - (4) Stem cells are specialized cells
59. In which one of the following the BOD (Biochemical Oxygen Demand) of sewage (S), distillery effluent (DE), paper mill effluent (PE) and sugar mill effluent (SE) have been arranged in ascending order ?
- (1) SE < PE < S < DE
  - (2) PE < S < SE < DE
  - (3) S < DE < PE < SE
  - (4) SE < S < PE < DE
60. The concept of chemical evolution is based on
- (1) Interaction of water, air and clay under intense heat
  - (2) Effect of solar radiation on chemicals
  - (3) Possible origin of life by combination of chemicals under suitable environmental conditions
  - (4) Crystallization of chemicals
61. Which one of the following is surrounded by a callose wall ?
- (1) Male gamete
  - (2) Egg
  - (3) Pollen grain
  - (4) Microspore mother cell
62. Probiotics are
- (1) Cancer inducing microbes
  - (2) New kind of food allergens

- (3) Live microbial food supplement  
(4) Safe antibiotics
63. One of endangered species of Indian medicinal plants is that of  
(1) *Ocimum* (2) Garlic  
(3) *Nepenthes* (4) *Podophyllum*
64. What is true about Nereis, Scorpion, Cockroach and Silver fish ?  
(1) They all possess dorsal heart  
(2) None of them is aquatic  
(3) They all belong to the same phylum  
(4) They all have jointed paired appendages
65. The living organisms can be unexceptionally distinguished from the non-living things on the basis of their ability for :  
(1) Interaction with the environment and progressive evolution  
(2) Reproduction  
(3) Growth and movement  
(4) Responsiveness to touch
66. A person who is on a long hunger strike and is surviving only on water, will have :  
(1) Less amino acids in his urine  
(2) More glucose in his blood  
(3) Less urea in his urine  
(4) More sodium in his urine
67. The length of DNA molecule greatly exceeds the dimensions of the nucleus in eukaryotic cells. How is this DNA accommodated ?  
(1) Super-coiling in nucleosomes  
(2) DNase digestion  
(3) Through elimination of repetitive DNA  
(4) Deletion of non-essential genes
68. A sequential expression of a set of human genes occurs when a steroid molecule binds to the  
(1) Messenger RNA (2) D N A sequence  
(3) Ribosome  
(4) Transfer RNA
69. In a coal fired power plant electrostatic precipitators are installed to control emission of :  
(1) NO<sub>x</sub> (2) SPM  
(3) CO (4) SO<sub>2</sub>
70. Select the **wrong** statement from the following :  
(1) Both chloroplasts and mitochondria have an internal compartment, the thylakoid space bounded by the thylakoid membrane  
(2) Both chloroplasts and mitochondria contain DNA  
(3) The chloroplasts are generally much larger than mitochondria  
(4) Both chloroplasts and mitochondria contain an inner and an outer membrane
71. Geometric representation of age structure is a characteristic of :  
(1) Population (2) Landscape  
(3) Ecosystem (4) B i o t i c community
72. During transcription, RNA polymerase holoenzyme binds to a gene promoter and assumes a saddle-like structure. What is its DNA-binding sequence ?  
(1) AATT (2) CACC  
(3) TATA (4) TTAA
73. A plant requires magnesium for :  
(1) Protein synthesis  
(2) Chlorophyll synthesis  
(3) Cell wall development  
(4) Holding cells together
74. In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result :  
(1) There is high degree of sterility  
(2) One can conclude that the plant is apomictic  
(3) Self fertilization is prevented  
(4) There is no change in success rate of fertilization

75. Ergot of rye is caused by a species of :
- (1) *Uncinula*                      (2) *Ustilago*  
(3) *Claviceps*                      (4) *Phytophthora*
76. The Finches of Galapagos islands provide an evidence in favour of :
- (1) Evolution due to Mutation  
(2) Retrogressive Evolution  
(3) Biogeographical Evolution  
(4) Special Creation
77. Which one of the following is a slime mould ?
- (1) *Physarum*                      (2) *Thiobacillus*  
(3) *Anabaena*                      (4) *Rhizopus*
78. The population of an insect species shows an explosive increase in numbers during rainy season followed by its disappearance at the end of the season. What does this show ?
- (1) The food plants mature and die at the end of the rainy season  
(2) Its population growth curve is of J- type  
(3) The population of its predators increases enormously  
(4) S-shaped or sigmoid growth of this insect
79. Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing microorganism ?
- (1) *Crotalaria juncea*  
(2) *Cycas revoluta*  
(3) *Cicer arietinum*  
(4) *Casuarina equisetifolia*
80. Which one of the following is being utilized as a source of biodiesel in the Indian countryside ?
- (1) Beetroot  
(2) Sugarcane                      (3) *Pongamia*  
(4) *Euphorbia*
81. For a critical study of secondary growth in plants, which one of the following pairs is suitable ?
- (1) Teak and pine  
(2) Deodar and fern  
(3) Wheat and maiden hair fern  
(4) Sugarcane and sunflower
82. Which one of the following is a fat-soluble vitamin and its related deficiency disease ?
- (1) Retinol - Xerophthalmia  
(2) Cobalamine - Beri-beri  
(3) Calciferol - Pellagra  
(4) Ascorbic acid - Scurvy
83. Two cells A and B are contiguous. Cell A has osmotic pressure 10 atm, turgor pressure - 7 atm and diffusion pressure deficit 3 atm. Cell B has osmotic pressure 8 atm, turgor pressure 3 atm and diffusion pressure deficit 5 atm. The result will be
- (1) No movement of water  
(2) Equilibrium between the two  
(3) Movement of water from Cell A to B  
(4) Movement of water from Cell B to A
84. In which one of the following preparations are you likely to come across cell junctions most frequently?
- (1) Thrombocytes                      (2) Tendon  
(3) Hyaline cartilage                      (4) Ciliated epithelium
85. If you are asked to classify the various algae into distinct groups, which of the following characters you should choose ?
- (1) Nature of stored food materials in the cell  
(2) Structural organization of thallus  
(3) Chemical composition of the cell wall  
(4) Types of pigments present in the cell
86. About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and :
- (1) Sulphur and magnesium  
(2) Magnesium and sodium  
(3) Calcium and phosphorus

- (4) Phosphorus and sulphur
87. Which one of the following statements is *correct* ?
- (1) Both *Azotobacter* and *Rhizobium* fix atmospheric nitrogen in root nodules of plants
  - (2) Cyanobacteria such as *Anabaena* and *Nostoc* are important mobilizers of phosphates and potassium for plant nutrition in soil
  - (3) At present it is not possible to grow maize without chemical fertilizers
  - (4) Extensive use of chemical fertilizers may lead to eutrophication of nearby water bodies
88. In this hexaploid wheat, the haploid ( $n$ ) and basic ( $x$ ) numbers of chromosome are :
- (1)  $n = 21$  and  $x = 21$
  - (2)  $n = 21$  and  $x = 14$
  - (3)  $n = 21$  and  $x = 7$
  - (4)  $n = 7$  and  $x = 21$
89. Passage cells are thin-walled cells found :
- (1) Phloem elements at that serve as entry points for substances for transport to other plant parts
  - (2) Testa of seeds to enable emergence of growing embryonic axis during seed germination
  - (3) Central region of style through which the pollen tube grows towards the ovary
  - (4) Endodermis of roots facilitating rapid transport of water from cortex to pericycle
90. What is common between parrot, platypus and kangaroo ?
- (1) Toothless jaws
  - (2) Functional post-anal tail
  - (3) Ovoparity
  - (4) Homoiothermy
91. Bowman's glands are located in the
- (1) Anterior pituitary
  - (2) Female reproductive system of cockroach
  - (3) Olfactory epithelium our nose
  - (4) Proximal end of uriniferous tubules
92. Which one of the following pairs is *wrongly* matched ?
- (1) Yeast - Ethanol
  - (2) Streptomyces - Antibiotic
  - (3) Coliforms - Vinegar
  - (4) Methanogens - Gobar gas
93. Which part of ovary in mammals acts as an endocrine gland after evolution ?
- (1) Stroma
  - (2) Germinal epithelium
  - (3) Vitelline membrane
  - (4) Graffian follicle
94. Opening of floral buds into flowers is a type of
- (1) Autonomic movement of variation
  - (2) Paratonic movement of growth
  - (3) Autonomic movement of growth
  - (4) Autonomic movement of locomotion
95. Which one of the following is a matching pair of a body feature and the animal possessing it ?
- (1) Ventral central nervous system - Leech
  - (2) Pharyngeal gills slits absent in embryo - Chamaeleon
  - (3) Ventral heart - Scorpion
  - (4) Post-anal tail - Octopus
96. All enzymes of TCA cycle are located in the mitochondrial matrix except one which is located in inner mitochondrial membranes in eukaryotes and in cytosol in prokaryotes. This enzyme is :
- (1) Isocitrate dehydrogenase
  - (2) Malate dehydrogenase
  - (3) Succinate dehydrogenase
  - (4) Lactate dehydrogenase

97. The first acceptor of electrons from an excited chlorophyll molecule of photosystem II is
- (1) Iron-sulphur protein (2) Ferredoxin  
(3) Quinone (4) Cytochrome
98. Differentiation of organs and tissues in a developing organism, is associated with
- (1) Differential expression of genes  
(2) Lethal mutations  
(3) Deletion of genes  
(4) Developmental mutations
99. Which one of the following statements about mycoplasma is **wrong** ?
- (1) They are pleomorphic  
(2) They are sensitive to penicillin  
(3) They cause diseases in plants  
(4) They are also called PPLO
100. Which one of the following pairs is **mismatched** ?
- (1) *Apis indica* – honey  
(2) *Kenia lacca* – lac  
(3) *Bombyx mori* – silk  
(4) *Pila globosa* – pearl
101. A person is having problems with calcium and phosphorus metabolism in his body. Which one of the following glands may not be functioning properly ?
- (1) Parotid (2) Pancreas  
(3) Thyroid (4) Parathyroid
102. A genetically engineered micro-organism used successfully in bioremediation of oil spills is a species of :
- (1) *Trichoderma* (2) *Xanthomonas*  
(3) *Bacillus* (4) *Pseudomonas*
103. In the leaves of  $C_4$  plants, malic acid formation during  $CO_2$  fixation occurs in the cells of
- (1) Bundle Sheath (2) Phloem  
(3) Epidermis (4) Mesophyll
104. Flagellated male gametes are present in all the three of which one of the following sets ?
- (1) *Zygenema*, *Saprolegnia* and *Hydrilla*  
(2) *Fucus*, *Marsilea* and *Calotropis*  
(3) *Riccia*, *Dryopteris* and *Cycas*  
(4) *Anthoceros*, *Funaria* and *Spirogyra*
105. If the mean and the median pertaining to a certain character of a population are of the same value, the following is most likely to occur
- (1) A bi-modal distribution  
(2) A T-shaped curve  
(3) A skewed curve  
(4) A normal distribution
106. A One gene - one enzyme relationship was established for the first time in
- (1) *Salmonella typhimurium*  
(2) *Escherichia Coli*  
(3) *Diplococcus pneumoniae*  
(4) *Neurospora crassa*
107. Two genes R and ;Y are located very close on the chromosomal linkage map of maize plant. When RRY Y and rry y genotypes are hybridized, the  $F_2$  segregation will show
- (1) Segregation in the expected 9 : 3 : 3 : 1 ratio  
(2) Segregation in 3 : 1 ratio  
(3) Higher number of the parental types  
(4) Higher number of the recombinant types
108. In cloning of cattle a fertilized egg is taken out of the mother's womb and
- (1) In the eight cell stage, cells are separated and cultured until small embryos are formed which are implanted into the womb of other cows  
(2) In the eight cell stage the individual cells are separated under electrical field for further development in culture media  
(3) From this upto eight identical twins can be produced  
(4) The egg is divided into 4 pairs of cells which are implanted into the womb of other cows
109. Ultrasound of how much frequency is beamed into human body for sonography ?
- (1) 15 - 30 MHz (2) 1 - 15 MHz  
(3) 45 - 70 MHz (4) 30 - 45 MHz
110. Two plants can be conclusively said to belong to the same species if they

- (1) Have more than 90 per cent similar genes  
 (2) Look similar and possess identical secondary metabolites  
 (3) Have same number of chromosomes  
 (4) Can reproduce freely with each other and form seeds
- 111.** Inheritance of skin colour in humans is an example of  
 (1) Point mutation  
 (2) Polygenic inheritance  
 (3) Codominance  
 (4) Chromosomal aberration
- 112.** When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed  
 (1) Microevolution  
 (2) Co-evolution  
 (3) Convergent evolution  
 (4) Divergent evolution
- 113.** Increased asthmatic attacks in certain seasons are related to  
 (1) Eating fruits preserved in tin containers  
 (2) Inhalation of seasonal pollen  
 (3) Low temperature  
 (4) Hot and humid environment
- 114.** Among the human ancestors the brain size was more than 1000 CC in  
 (1) *Homo erectus*  
 (2) *Ramapithecus*  
 (3) *Homo habilis*  
 (4) *Homo neanderthalensis*
- 115.** Industrial melanism as observed in peppered moth proves that  
 (1) The melanic form of the moth has no selective advantage over lighter form in industrial area  
 (2) The lighter-form moth has no selective advantage either in polluted industrial area or non-polluted area  
 (3) Melanism is a pollution-generated feature  
 (4) The true black melanic forms arise by a recurring random mutation
- 116.** A high density of elephant population in an area can result in  
 (1) Intra specific competition  
 (2) Inter specific competition  
 (3) Predation on one another  
 (4) Mutualism
- 117.** A drop of each of the following, is placed separately on four sides. Which of them will *not* coagulate ?  
 (1) Blood serum  
 (2) Sample from the thoracic duct of lymphatic system  
 (3) Whole blood from pulmonary vein  
 (4) Blood plasma
- 118.** Which one of the following ecosystem types has the highest annual net primary productivity ?  
 (1) Tropical deciduous forest  
 (2) Temperate evergreen forest  
 (3) Temperate deciduous forest  
 (4) Tropical rain forest
- 119.** In human body, which one of the following is anatomically correct ?  
 (1) Collar bones – 3 pairs  
 (2) Salivary glands – 1 pair  
 (3) Cranial nerves – 10 pairs  
 (4) Floating ribs – 2 pairs
- 120.** Telomere repetitive DNA sequence control the function of eukaryote chromosomes because they  
 (1) Are RNA transcription initiator  
 (2) Help chromosome pairing  
 (3) Prevent chromosome loss  
 (4) Act as replicons
- 121.** Spore dissemination in some liverworts is aided by  
 (1) Indusium (2) Calyptra  
 (3) Peristome teeth (4) Elaters
- 122.** Which one of the following elements is not an essential micronutrient for plant growth ?  
 (1) Zn (2) Cl  
 (3) Ca (4) Mn
- 123.** The overall goal of glycolysis, Krebs cycle and the electron transport system is the formation of  
 (1) ATP in one large oxidation reaction

- (2) Sugars  
 (3) Nucleic acids  
 (4) ATP in small stepwise units
- 124.** Adaptive radiation refers to  
 (1) Evolution of different species from a common ancestor  
 (2) Migration of members of a species to different geographical areas  
 (3) Power of adaptation in an individual to a variety of environments  
 (4) Adaptations due to Geographical isolation
- 125.** Which one of the following pairs, is not correctly matched ?  
 (1) Gibberellic Acid – Leaf fall  
 (2) Cytokinin – Cell division  
 (3) IAA – Cell wall elongation  
 (4) Abscissic Acid – Stomatal closure
- 126.** Select the correct statement from the following  
 (1) Fitness is the end result of the ability to adapt and gets selected by nature  
 (2) All mammals except whales and camels have seven cervical vertebrae  
 (3) Mutations are random and directional  
 (4) Darwinian variations are small and directionless
- 127.** Male gametes in angiosperms are formed by the division of  
 (1) Generative cell  
 (2) Vegetative cell  
 (3) Microspore mother cell  
 (4) Microspore
- 128.** In pea plants, yellow seeds are dominant to green. If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in  $F_1$  generation ?  
 (1) 9 : 1                      (2) 1 : 3  
 (3) 3 : 1                      (4) 50 : 50
- 129.** Which one of the following mammalian cells is not capable of metabolising glucose to carbon-dioxide aerobically ?  
 (1) Unstriated muscle cells  
 (2) Liver cells  
 (3) Red blood cells  
 (4) White blood cells
- 130.** A human male produces sperms with the genotypes AB, Ab, aB, and ab pertaining to two diallelic characters in equal proportions. What is the corresponding genotype of this person ?  
 (1) Aabb                      (2) AABb  
 (3) AABB                      (4) AaBb
- 131.** What is common to whale, seal and shark ?  
 (1) Thick subcutaneous fat  
 (2) Convergent evolution  
 (3) Homiothermy  
 (4) Seasonal migration
- 132.** One of the important consequences of geographical isolation is  
 (1) Preventing Speciation  
 (2) Speciation through reproductive isolation  
 (3) Random creation of new species  
 (4) No change in the isolated fauna
- 133.** Lysozyme that is present in perspiratin, saliva and tears, destroys  
 (1) Certain types of bacteria  
 (2) All viruses  
 (3) Most virus – infected cells  
 (4) Certain fungi
- 134.** In the human female, menstruation can be deferred by the administration of  
 (1) Combination of FSH and LH  
 (2) Combination of estrogen and progesterone  
 (3) FSH only  
 (4) LH only
- 135.** Which one of the following is not a constituent of cell membrane ?  
 (1) Glycolipids                      (2) Proline  
 (3) Phospholipids                      (4) Cholesterol
- 136.** Compared to a bull a bullock is docile because of  
 (1) Higher levels of cortisolone  
 (2) Lower levels of blood testosterone  
 (3) Lower levels of adrenalin / noradrenalin in its blood  
 (4) Higher levels of thyroxin

- 137.** During the transmission of nerve impulse through a nerve fibre, the potential on the inner side of the plasma membrane has which type of electric charge ?
- (1) First positive, then negative and continue to be negative
  - (2) First negative, then positive and continue to be positive
  - (3) First positive, then negative and again back to positive
  - (4) First negative, then positive and again back to negative
- 138.** Which one of the following pairs of organisms are exotic species introduced in India ?
- (1) *Lantana camara*, Water hyacinth
  - (2) Water hyacinth, *Prosopis cineraria*
  - (3) Nile perch, *Ficus religiosa*
  - (4) *Ficus religiosa*, *Lantana camara*
- 139.** In gymnosperms, the pollen chamber represents
- (1) A cavity in the ovule in which pollen grains are stored after pollination
  - (2) An opening in the megagametophyte through which the pollen tube approaches the egg
  - (3) The microsporangium in which pollen grains develop
  - (4) A cell in the pollen grain in which the sperms are formed
- 140.** Molecular basis of organ differentiation depends on the modulation in transcription by
- (1) Ribosome
  - (2) Transcription factor
  - (3) Anticodon
  - (4) RNA polymerase
- 141.** Which one of the following is an example of negative feedback loop in humans ?
- (1) Secretion of tears after falling of sand particles into the eye
  - (2) Salivation of mouth at the sight of delicious food
  - (3) Secretion of sweat glands and constriction of skin blood vessels when it is too hot
  - (4) Constriction of skin blood vessels and contraction of skeletal muscles when it is too cold
- 142.** The two polynucleotide chains in DNA are
- (1) Discontinuous
  - (2) Antiparallel
  - (3) Semiconservative
  - (4) Parallel
- 143.** Which of the following pairs are correctly matched ?
- Animals**
- Morphological features**
- |                   |   |                   |
|-------------------|---|-------------------|
| (A) Crocodile     | – | 4-Chambered heart |
| (B) Sea Urchin    | – | Parapodia         |
| (C) <i>Obelia</i> | – | Metagenesis       |
| (D) Lemur         | – | Thecodont         |
- (1) B, C and D
  - (2) Only A and D
  - (3) Only A and B
  - (4) A, C and D
- 144.** Which one of the following pairs of structures distinguishes a nerve cell from other types of cell ?
- (1) Vacuoles and fibres
  - (2) Flagellum and medullary sheath
  - (3) Nucleus and mitochondria
  - (4) Perikaryon and dendrites
- 145.** In maize, hybrid vigour is exploited by
- (1) Crossing of two inbred parental lines
  - (2) Harvesting seeds from the most productive plants
  - (3) Inducing mutations
  - (4) Bombarding the seeds with DNA
- 146.** Which one of the following is a viral disease of poultry ?
- (1) Coryza
  - (2) New Castle disease
  - (3) Pasteurellosis
  - (4) Salmonellosis
- 147.** The wavelength of light absorbed by Pr form of phytochrome is
- (1) 680 nm
  - (2) 720 nm
  - (3) 620 nm
  - (4) 640 nm
- 148.** Which one of the following is not a bioindicator of water pollution ?
- (1) Blood-worms
  - (2) Stone flies
  - (3) Sewage fungus
  - (4) Sludge-worms
- 149.** Feeling the tremors of an earthquake a scared resident of seventh floor of a multistoreyed building starts climbing down the stairs rapidly. Which hormone initiated this action ?
- (1) Adrenaline
  - (2) Glucagon
  - (3) Gastrin
  - (4) Thyroxin
- 150.** “Foolish Seedling” disease of rice led to the discovery of
- (1) ABA
  - (2) 2, 4-D
  - (3) IAA
  - (4) GA

- Sol: Ans [1]** Rules of Binomial nomenclature are framed by five codes of nomenclature. ICBN frames rules for naming plants.
- Sol: Ans [4]** Birds nest fungi is *Cyathus* and puffballs is *Lycoperdon* belonging to basidiomycetes. *Claviceps Peziza* and *Morchella* belong to Ascomycetes.
- Sol: Ans [4]** Biological organisation begins with genes and other molecules which form subcellular structures.
- Sol: Ans [4]**
- Sol: Ans [1]** Serum globulins are the major components of antibodies.
- Sol: Ans [2]** By selfing.
- Sol: Ans [3]** In the lagging strand, polymerisation occurs in 5' – 3' direction like the leading strand and therefore it confirms that DNA replication occurs only on 3' – 5' strand.
- Sol: Ans [3]** Embryonic development of an organism (ontogeny), repeats its evolutionary history (phylogeny).
- Sol: Ans [2]** BOD is higher in polluted water and is connected with both microbes and organic matter.
- Sol: Ans [3]** Concept of chemical evolution is given by Operin and Haldane and proved by Stanley Miller and Urey.
- Sol: Ans [4]** The microspore mother cells or microsporocytes develop an internal layer of callose which breaks the plasmodesmal connections among themselves. The separated mother cells round off and undergo meiosis to produce microspore tetrads.
- Sol: Ans [3]** The dietary supplement (bacteria) which may assist digestion or help, protect against some harmful bacteria.
- Sol: Ans [4]** *Podophyllum* is an endangered species which yields anti cancer drug.
- Sol: Ans [1]** All are invertebrate nereis is aquatic annilid others are arthropode.
- Sol: Ans [1]**
- Sol: Ans [3]** Prolong starvation proteins are more metabolised to produce energy. Reduce the production of NH<sub>3</sub>. Hence less urea in his urine.
- Sol: Ans [1]** According to Solenoid model, at intervals DNA is associated with groups of histone proteins to form nucleosomes. This beaded string is coiled to form solenoid like a cylindrical coil of wire. The solenoid is coiled into super solenoid of 2000 – 4000 Å
- Sol: Ans [2]** Steroid are gene acting hormones.
- Sol: Ans [2]** Electrostatic precipitators are electrically charged plates or electrodes which remove most of the particles present in chimney exhausts.
- Sol: Ans [1]** Mitochondria do not have thylakoid membranes.
- Sol: Ans [1]** Bodonheimer proposed three age groups in a population – pre reproductive, reproductive and post reproductive. Graphic representation of different age groups found in a population with pre-reproductive groups at the base, reproductive ones in the middle and post-reproductive groups at the top is called age pyramid.
- Sol: Ans [3]** TATA box helps in bending of the DNA and the attachment of RNA polymerase at the start point of structural gene.
- Sol: Ans [2]** Magnesium is the only mineral present in chlorophyll.
- Sol: Ans [3]** The antherozoid or eggs which mature first can fertilise only gametes of another prothallus ensuring cross fertilisation.

- Sol: Ans [3]** *Claviceps* produces ergot of rye in which ears come to have sclerotia of the fungus. Sclerotia contain a number of alkaloids, the most important being lysergic acid and ergot.
- Sol: Ans [3]** The finches of the different icelands varied yet they were closely related to each other.
- Sol: Ans [1]** *Physarum* is a cellular slime moulds.
- Sol: Ans [2]** In J-shaped growth curve, the exponential phase continues beyond the carrying capacity of environment Equilibrium phase does not occur. Instead a steep or sharp decline in population takes place. It is called crush phase.
- Sol: Ans [4]** *Casuarina equisetifolia*, a flowering plant has root nodules containing *Frankia* (an actinomycetes) which can fix atmospheric nitrogen.
- Sol: Ans [3]** *Pongamia* is a source of biodiesel in India.
- Sol: Ans [1]** Teak (*Tectona grandis*) is an angiosperm dicot and *Pinus* – a gymnosperm shows secondary growth. Fern (a pteridophyte), wheat (monocot), sugarcane (monocot), maiden hair fern (pteridophyte) are vascular plants but they lack secondary growth.
- Sol: Ans [1]** Retinol / Vit. A is a fat soluble vitamin. Its deficiency causes xerophthalmia, Nyctalopia etc.
- Sol: Ans [3]** Movement of water is from region of lower DPD to a region of higher DPD.
- Sol: Ans [4]** The cells of epithelium are in very close contact with each other hence require more cell junction.
- Sol: Ans [4]** Algae are usually differentiated on the basis of their pigments.
- Sol: Ans [4]** Phosphorus is present in Nucleic acid and Sulphur is present in some Amino acids.
- Sol: Ans [4]** Run off from agriculture is polluted with pesticides and fertilisers.
- Sol: Ans [3]**
- Sol: Ans [4]** Endodermis is the innermost layer of the cortex and it possess a band of thickening called casparian strip which prevents wall to wall movement of substances.
- Sol: Ans [4]** Bird and mammals are homiothermal.
- Sol: Ans [3]** Present in olfactory epithelium and secrete mucous.
- Sol: Ans [3]**
- Sol: Ans [4]**
- Sol: Ans [3]** Opening of flower is because of more growth on the upper surface of sepals and petals and this is called epinasty.
- Sol: Ans [1]**
- Sol: Ans [3]** Succinate dehydrogenase is the only enzyme of Krebs cycle which is not present in mitochondrial matrix.
- Sol: Ans [3]** Quinone is the primary acceptor of electron from an excited chlorophyll of photosystem II.
- Sol: Ans [1]**
- Sol: Ans [2]** Penicillin cannot affect myeoplasmas because they lack cell wall and penicillin affects cell wall synthesis.
- Sol: Ans [4]** Pearl secreted by *Pinctada* sps.
- Sol: Ans [4]** Parathyroid secrete parathormone which helps in maintainance of calcium and phosphorus level in blood.
- Sol: Ans [4]**

- Sol: Ans [4]**
- Sol: Ans [3]** *Hydrilla*, *Calotropis* and *Spirogyra* have male gametes without flagella. *Riccia* has biflagellate and *Dryopteris* and *Cycas* multiflagellate male gametes.
- Sol: Ans [4]** Balancing selection, stabilising selection represents bell shaped curve which represents normal distribution.
- Sol: Ans [4]** From their work on *Neurospora crassa*, Beadle and Tatum proposed one gene one enzyme hypothesis and defined gene as a unit of hereditary material that specifies single enzyme.
- Sol: Ans [2]** They show complete linkage which allows the combination of parental traits to be inherited as such due to absence of crossing over.
- Sol: Ans [1]**
- Sol: Ans [2]**
- Sol: Ans [4]** Mayr has defined species as a group of actually or potentially interbreeding populations that are reproductively isolated from other such groups.
- Sol: Ans [2]** Human skin colour was first studied by Davanport. It is due to three pairs of polygenes.
- Sol: Ans [3]** Definition of convergent evolution.
- Sol: Ans [2]** Pollens of *Parthenium* etc. cause allergies like asthma and hay fever. These are called aeroallergens.
- Sol: Ans [4]** Neanderthal man – 1400 – 1450 c.c.
- Sol: Ans [4]** It is an example of natural selection.
- Sol: Ans [1]** Requirement of similar need such as food, shelter and mate.
- Sol: Ans [1]** Serum is defibrinated blood which cannot coagulate.
- Sol: Ans [4]** Productivity of tropical rain forest is very high 12000 Kcal/m<sup>2</sup>/yr as compared to 3000 Kcal/m<sup>2</sup>/yr for temperate deciduous forest.
- Sol: Ans [4]**
- Sol: Ans [3]**
- Sol: Ans [4]** Elaters are found in *Marchantia* which possess spiral hygroscopic thickenings which help in dehiscence of capsule.
- Sol: Ans [3]** Calcium is a macro nutrient.
- Sol: Ans [4]**
- Sol: Ans [4]** Based on definition.
- Sol: Ans [1]** Gibberellic is not associated with leaf fall.
- Sol: Ans [1]**
- Sol: Ans [1]** Generative cell divides into two male gametes.
- Sol: Ans [4]** Test cross ratio is 1 : 1.
- Sol: Ans [3]** Absence of mitochondria.
- Sol: Ans [4]** Double heterozygous genotype can produce four types of above-mentioned gametes.
- Sol: Ans [2]** The fin of fishes and flipper of aquatic mammals exhibits similar function but are different in origin.
- Sol: Ans [2]** Geographical isolation results in separation, gradual changes, hence speciation due to reproductive isolation.
- Sol: Ans [1]** Antibacterial.
- Sol: Ans [2]** Increased level of progesterone provides pseudostate of pregnancy hence delayed / deferred menstruation.

**Sol: Ans [2]**

**Sol: Ans [2]** Destruction of testis (castration) results in decrease secretion of testosterone.

**Sol: Ans [4]**

**Sol: Ans [1]** *Lantana camara* and *Water hyacinth* are exotic species introduced in India. They become invasive and drive away the local species. These species are considered to be second major cause of extinction of species.

**Sol: Ans [1]** Pollen chamber is present at the apex of ovules of gymnosperm. The micropylar canal opens into a space just above the nucellus called pollen chamber.

**Sol: Ans [2]**

**Sol: Ans [4]** During low temperature body prevent heat ions by negative feedback mechanism through cutaneous vasoconstriction and shivering.

**Sol: Ans [2]** Antiparallel. One of the strands run in the 5' - 3' direction and the other 3' - 5' direction.

**Sol: Ans [4]**

**Sol: Ans [4]**

**Sol: Ans [1]**

**Sol: Ans [2]**

**Sol: Ans [1]**

**Sol: Ans [2]** Water pollution is caused by sewage which stimulates the activity of several decomposers called sewage fungus. Stone flies (*Plectrothera*) is very sensitive to water pollution and hence absent in polluted waters. *Tubifex* (Sludge worm), *Chironomus* (Blood worm) are pollution tolerant species which can survive and are considered to be pollution indicators.

**Sol: Ans [1]** Adrenaline is a fight, fright or emergency hormone.

**Sol: Ans [4]** Foolish Seedling disease is caused by *Gibberella fujikori* which is a source of Gibberellic acid.

