101. The alga shows isomorphic type of alternation of generations in the life cycle is
(1) *Volvox* (2) *Chlamydomonas*
(3) *Ectocarpus* (4) *Spirogyra*

102. The hypnospores of *Chlamydomonas nivalis* produce red snow due to the presence of a reddish pigment called
(1) Haemoglobin
(2) Erythrin
(3) Anthocyanin
(4) Haematochrome

103. *Harveyella*, a colourless and parasitic alga belongs to
(1) Rhodophyceae (2) Phaeophyceae
(3) Cyanophyceae (4) Chlorophyceae

104. Which of the following is a non green saprophytic bryophyte found on rotten wood ?
(1) *Sphagnum*
(2) *Polytrichum*
(3) *Buxbaumia*
(4) *Ricciocarpus natans*

105. A foliose bryophyte, exhibiting radial symmetry and multicellular oblique septa is
(1) *Marchantia* (2) *Funaria*
(3) *Riccia* (4) *Anthoceros*

106. The liberation of spores in *Riccia* takes place by
(1) Peristomial teeth and seta
(2) Shrinkage of annulus and bursting of capsule
(3) Death and decay of thallus and external pressure on calyptra
(4) Xerochasy of elaters

107. Stomata in *Funaria* are present in ..... region of the sporophyte
(1) Seta (2) Columella
(3) Calyptra (4) Apophysis

108. Which of the following is a bryophyte?
(1) Bog moss (2) Club moss
(3) Irish moss (4) Reindeer moss

109. Formation of gametophyte like structure from sporophyte without reduction division (without formation of spores) is called
(1) Apogamy
(2) Apospory
(3) Apomixis
(4) Agametospermy

110. Prothallus of fern is
(1) Homothallic (2) Heterothallic
(3) Heterotrophic (4) Chemotrophic

111. A typical protostele which may be rounded or flattened as in *Selaginella chrysocaulos* is
(1) Actinostele (2) Plectostele
(3) Haplostele (4) Siphonostele

112. The transverse section of internode of *Equisetum* stem shows epidermis which is cutinised and impregnated on the outer side with
(1) Calcium carbonate (2) Calcium oxalate
(3) Lignin (4) Silica

113. Commercially 'Sago' is obtained from
(1) *Abies balsamea*
(2) *Juniperus virginiana*
(3) *Metroxylon rumphii*
(4) *Sequoia gigantea*

114. Which of the following order of Gymnosperms has only fossils?
(1) Gnetales (2) Coniferales
(3) Ginkgoales (4) Cordaitales

115. Which of the following statement is not true for *Pinus* ?
(1) Mycorrhizal associations with the root
(2) Archegoniated ovules
(3) Winged fruits
(4) Resin canals in stem

116. Cleavage polyembryony is found in
(1) *Cycas*
(2) *Pinus*
(3) Absent in both *Cycas* and *Pinus*
(4) Both (1) and (2)

117. Bentham and Hooker have placed all the plants under various categories but they failed to place few orders satisfactorily, they are called
(1) Obligate categories
(2) Ordines anomali
(3) Correlated orders
(4) All of these

118. 'Ligule' a tongue like scaly structure is present in the leaf of

(1) *Selaginella* (2) *Pteris*
(3) Grasses (4) Both (1) & (3)

119. Which of the following statements is false for chromatin ?
(1) It occurs in a non dividing nucleus as fine filaments called chromatin fibres
(2) Chromatin fibres are simply greatly elongated chromosomes
(3) During cell division chromatin fibres form short thick rod like organelles called chromosomes
(4) None of these

120. Which of these is incorrect about ribosomes ?
(1) These are submicroscopic particles made up of RNA and proteins
(2) These are attached to the endoplamic reticulum through the ribophorins
(3) There can be aggregates of ribosomes (polyribosomes) on mRNA
(4) Sedimentation coefficient of ribosomes of bacteria, mitochondria and chloroplasts are the same as those of cytoplasmic ribosomes of eukaryotes

121. Which is an incorrect statement ?
(1) Microtubules take part in cell division
(2) Detoxification site in liver cells is in SER.
(3) The nucleolus contains DNA
(4) Centrioles are located on the chromosomes

122. Which of the following cellular organelles are without membrane ?
(1) Vacuoles, centrioles, nucleolus
(2) E.R., microbodies, microtubules
(3) Microfilaments, ribosomes, mitochondria
(4) Nucleolus, centrioles, ribosomes

123. Which of the following is not a similarity between mitochondria and chloroplast?
(1) Both are self replicating
(2) DNAs present as a circular loop and naked (no histones)
(3) Both are surrounded by two phospholipid - protein membranes
(4) Electron (hydrogen) carrier systems are same

124. Which of the following statements is true for E.R.?
(1) In retinal cells these do not have ribosomes, act as photoreceptors and are called myeloid bodies
(2) In muscle cells these are called sarcoplasmic reticulum
(3) Glucose - 6 - phosphatase is a marker enzyme for SER
(4) All of these

125. The enzyme glycosyl transferases is present in :
(1) Mitochondria (2) Lysosome
(3) Golgibody (4) Peroxisomes

126. Chromosomes form a bouquet during
(1) Leptotene of meiosis
(2) Pachytene of meiosis
(3) Anaphase of mitosis
(4) Telophase of mitosis

127. Which one of the following is correctly matched explaining the particular stage of meiotic prophase and the event occurring in it?
(1) Diplotene—Chiasma formation and separation of chromosomes
(2) Leptotene—Homologous chromosomes get associated as bivalents
(3) Pachytene—Homologous chromosomes come in pairs
(4) Zygotene—Chromatin begins to get compacted showing fine threads

128. Which of the following statements is/are true for G_2 phase of cell cycle ?
(1) Synthesis of RNA and proteins continue
(2) Centrioles replicate
(3) Repair of damaged DNA sequences takes place
(4) All of these

129. The nucleoid of *Retroviruses* is
(1) SS-RNA, haploid (2) SS-RNA, diploid
(3) DS-RNA, haploid (4) DS-RNA, diploid

130. Which one of the following statements about viruses is correct ?
(1) Viruses contain either DNA or RNA
(2) Viruses possess their own metabolic system
(3) Viruses are facultative parasites
(4) Viruses are readily killed by antibiotics

131. The protists have
(1) Gene containing nucleoproteins condensed together in loose mass
(2) Nucleoprotein in direct contact with the rest of the cell substance
(3) Only free nucleic acid aggregates
(4) Membrane bound nucleoproteins lying embedded in the cytoplasm

132. The slime moulds are characterized by the presence of
(1) Elaters (2) Pseudoelaters
(3) Capillitium (4) Both (1) and (2)

133. A carcinogen present in the mould *Aspergillus flavus* which grow in goundnuts and storage grains is
(1) Phenacetin (2) Vinyl chloride
(3) Aflatoxin (4) Benzidine

134. Which one of the following is common to both prokaryotes and eukaryotes ?
(1) Mitotic apparatus (2) Histones
(3) Mitochondria (4) Genetic code

135. The yeast differ from *Penicillium* in being
(1) Unicellular and uninucleated
(2) Unicellular and multinucleated
(3) Parasitic and septate
(4) Saprophytic and aseptate

136. The repeating spores of *Puccinia* are
(1) Uredospores (2) Teleutospores
(3) Basidiospores (4) Aeciospores

137. The energy parasites are
(1) Archaebacteria (2) Mycoplasma
(3) Chlamydiae (4) Actinomycetes

138. A budding bacterium among the following is
(1) *Rhodomicrobium* (2) *Beggiatoa*
(3) *Actinomyces* (4) *Spirochaeta*

139. The bacterium *Chromatium* is a
(1) Photolithotroph
(2) Photo-organotroph
(3) Chemolithotroph
(4) Chemo-organotroph

140. In Endomycorrhiza, the fungus is generally
(1) Ascomycetes (2) Zygomycetes
(3) Basidiomycetes (4) Deuteromycetes

141. Which one of the following organisms can respire in the absence of oxygen ?
(1) *Azotobacter* (2) *Clostridium*
(3) *Rhizobium* (4) *Lactobacillus*

142. Turril's omega (ω) taxonomy is connected with
(1) Collection of biota
(2) Identification of organisms
(3) Bringing out relationships
(4) Compilation of flora and fauna

143. Which of the following disease is caused by viroids ?
(1) Wart disease of potato
(2) Potato spindle tuber
(3) Early blight of potato
(4) Potato leaf roll

144. Which one is a mismatch ?
(1) *Streptomyces*—Antibiotic
(2) *Serratia*—Drug addiction
(3) *Rhizobium*—Biofertilizer
(4) *Spirulina*—Single cell protein

145. Biological species concept
(1) Describes about the individuals which freely interbreed, closely resemble each other and differ visibly from all other groups within a species
(2) Is the most simple and states that the individuals of a species match the type as closely as possible
(3) Explains the species have no existence where as individuals have existence
(4) States the species have existence where as individuals donot have existence

146. Items in which of the following pairs are unrelated
(1) Ascocarp—Ascogonium
(2) Conidiophore—Metulae
(3) Basidiocarp—Gills
(4) Ascocarp—Archegonium

147. After conjugation with Hfr the remaining replica of DNA of the donor cell
(1) Degenerates in the donor cell
(2) Persists in the donor cell
(3) Sent back to the donor cell
(4) Degenerates in the recipient cell

148. The protistans in which cell size decreases with each division are
(1) Dinoflagellates (2) Diatoms
(3) Slime Moulds (4) Radiolarians

149. In *Agaricus*, the largest phase of nuclear condition is
(1) n (2) $2n$
(3) $n + n$ (4) $3n$

150. *Ashbya gossypi* is
(1) Fungus producing riboflavin
(2) Fungus forming B_{12}
(3) Actinomycetes excreting vitamin A
(4) Bacterium forming antibodies151. The tornaria larva of *Balanoglossus* resembles with
(1) Trochophore larva of Annelida
(2) Glochidium larva of Mollusca
(3) Bipinnaria larva of Echinodermata
(4) Veliger larva of Mollusca

152. Most serious trematode parasitizing blood of man is
(1) *Schistosoma haematobium*
(2) *Echinococcus granulosus*
(3) *Taenia saginata* (4) *Taenia solium*

153. Stalked echinoderms belong to
(1) Asteroidea (2) Ophiuroidea
(3) Echinoidea (4) Crinoidea

154. The one which provides surface for attachment of flight muscles in birds is
(1) Clavicle (2) Synsacrum
(3) Carina (4) Pygostyle

155. Suctorial mouth and parasitic mode of life is associated with
(1) Shark (2) *Petromyzon*
(3) Gnathostomata (4) Fish

156. Which of the following is called maruspial frog
(1) *Pipa* (2) *Bufo*
(3) *Hyla* (4) *Gastrotheca*

157. Scroll valve is present in the intestine of
(1) Dog fish (2) Devil fish
(3) Cuttle fish (4) Flying fish

158. 'Maurer's dots' are found in the:
(1) *Plasmodium vivax*
(2) *Plasmodium ovale*
(3) *Plasmodium malariae*
(4) *Plasmodium falciparum*

159. Prosopyles connect :
(1) The incurrent canal with flagellated chamber
(2) The incurrent canal with spongocoel
(3) The flagellated chamber with excurrent canal
(4) The flagellated chamber with spongocoel

160. There are several species of *Fasciola*. One which inhabits man is :
(1) *Fasciola hepatica* (2) *F. indica*
(3) *F. buski* (4) None of these

161. Which of the following glial cells are not present in Brain
(1) Oligodendrocytes (2) Ependymal cells
(3) Schwann cells (4) Microglial cells

162. Moulting of *Ascaris* larva occurs four times during its life-cycle i.e.
(1) All the four outside the body of man
(2) One outside but within the egg-shell, two in lungs and one in the intestine of man
(3) All the four inside the body of the host
(4) All moultings in soil

163. Blood glands in earthworm are found in
(1) 2, 3 and 4 segments (2) 4, 5 and 6 segments
(3) 7, 8, 9 segments (4) 14, 15 and 16 segments

164. If all nephridia of an earthworm were to become exonephric
(1) Coneservation of water in body during summer would become difficult
(2) Excretion would stop
(3) Urine would have more water
(4) Urine would have less salt

165. In male cockroach the sperms are nourished and stored in :
(1) Testes (2) Utricular gland
(3) Ejaculatory duct (4) Conglobate gland

166. What will happen if peritrophic membrane is not formed in cockroach :
(1) Digestion of food will stop
(2) Absorption of food will stop
(3) Midgut will be injured
(4) There will be no absorption of water from faces

167. The function of stomodaeal valve in cockroach is :
(1) To prevent the entry of food from gizzard into mesenteron
(2) To prevent the reentry of food from mesenteron into the gizzard
(3) To prevent the entry of hepatic secretion into the crop
(4) To allow only one particles of food to enter in the mesenteron

168. Organs of Bojanus are associated with :
(1) Respiratory system (2) Excretory system
(3) Endocrine system (4) Reproductive system

169. Aristotle's lantern is found in :
(1) Jelly fish (2) Sea anemone
(3) Sea-lily (4) Sea-Urchin

170. Wall of urinary bladder has
(1) Pseudostratified epithelium
(2) Transitional epithelium
(3) Keratinized epithelium
(4) Squamous epithelium

171. Dense connective tissue in the form of cords is present in

(1) Ligaments (2) Spinal cord
(3) Tendons (4) Spleen

172. Osteon consists of
(1) Outer circumferential lamellae & Haversian canals
(2) Inner circumterential lamellae & volkman's canals
(3) Haversian lamellae & Haversian canals
(4) Interstial lamellae & Volkman's canals

173. In skeletal muscles titin protein connects
(1) M-line with Z-line
(2) Z-line with sarcolemma
(3) Sarcolemma with M-line
(4) Actin with Myosin

174. Characteristics of cardiac muscle fibres are
(1) Spindle shaped, unbranched, striated and involuntary
(2) Cylindrical, branched, striated, uninucleated and involuntary
(3) Cylindrical, unbranched, nonstriated, uninucleated, voluntary
(4) Spindle shaped unbranched, nonstriated, uninucleated, voluntary and with intercalated disc

175. Os penis is present in
(1) Rat, bat, dog, walrus (2) Rat, frog, dog, walrus
(3) Rat, frog, earthworm, dog
(4) Rat & frog only

176. Which of the following is/are used by blood banks to preserve or prevent blood samples from clotting ?
(1) Citrate-phosphate dextrose
(2) Acid citrate dextrose
(3) Ethylene diamine tetracetic acid
(4) All of these

177. Which of the following tissue is also known as pavement tissue?
(1) Areolar tissue (2) Squamous epithelium
(3) Cuboidal epithelium
(4) Dense connective tissue

178. Which of the following is formed by the ossification of tendons ?
(1) Sesmoid bones (2) Membranous bones
(3) Cartilagenous bones (4) Decalcified bones

179. Mark the incorrect match
(1) Fibrous cartilage : Intervertebral disc
(2) Elastic cartilage : Epiglottis
(3) Hyaline cartilage : Sternum
(4) Calcified cartilage : Pinna

180. Match the following

Column I	Column II
a. Matrix of bone	(i) Diaphysis
b. Bone eating cells	(ii) Chondriocyte
c. Terminal part of bone	(iii) Epiphysis
d. Cells of cartilage	(iv) Ossein
	(v) Osteoclast
	(vi) Chondrin

(1) a-iii, b-i, c-iv, d-vi (2) a-iv, b-ii, c-iii, d-vi
(3) a-iv, b-v, c-iii, d-ii (4) a-i, b-ii, c-iii, d-iv

181. Which of the following vertebrate belongs to tetrapoda but limbs are absent
A. *Ichthyophis*
B. *Ophiosaurus*
C. *Hemidactylus*
(1) A only (2) A & C
(3) B & C (4) A & B

182. Mesodermal calcareous endoskeleton is found in
(1) Sandfly (2) Sea squirt
(3) Sand dollar (4) *Nautilus*

183. The dorsal fin is modified into a sucker in
(1) *Torpedo* (2) *Hippocampus*
(3) *Exocoetus* (4) *Echeneis*

184. Mismatch is
(1) Chimpanzee : Most intelligent ape
(2) *Hippopotamus* : Horse of the river
(3) Artiodactyla : Odd toed mammals
(4) Cetaceans : Aquatic mostly carnivorous

185. Which of the following migrates to marine water for spawning ?
(1) *Latimeria* (2) *Gambusia*
(3) *Exocoetus* (4) *Anguilla*

186. An animal has 7 cervical vertebra, diaphragm between thorax and abdomen, 4-chambered heart and viviparous nature with true placenta - what group do you think, the animal belongs to ?
(1) Only cetacea (2) Prototheria
(3) Metatheria (4) Monotremata

187. Which protein of blood plasma help in the transport of heavy molecular weight substances?
(1) γ -globulin (2) α -globulin
(3) Thrombin (4) Fibrinogen

188. Which one is true for frogs ?

a. They move to water to lay eggs

b. They have four digits in fore limb and 5 digits in hind limb

c. They have moderate length of neck

d. Tympanum is visible externally

(1) a, b, c and d (2) a, b and c

(3) a, b and d (4) a, c and d

189. Match the columns

Column I	Column II
A. Simple Columnar Epithelium	P. Wall of heart
B. Cardiac Muscles	Q. Bone joints
C. Adipose Tiusse	R. Inner lining of stomach and intestine
D. Hyaline Cartilage	S. Below the skin in abdomen
	T. Diaphragm

(1) A- R, B - P, C - S, D - Q

(2) A- R, B - T, C - Q, D - S

(3) A- P, B - R, C - S, D - T

(4) A- R, B - P, C - T, D - S

190. Bones become fragile in

(1) osteoporosis (2) gout

(3) arthritis (4) none of these

191. If EDTA is injected into the muscles it combines with Ca^{2+} ions and then

(1) contraction occurs (2) little contraction occurs

(3) no contraction occurs

(4) none of these

192. Mark the wrong match from the following regarding earthworm

(1) Female genital aperture : Midventral line of 14^{th} segment

(2) A pair of male genital aperture : Ventrolateral sides of 18^{th} segment

(3) Genital papillae : Ventral surface of 17^{th} and 19^{th} segment

(4) Clitellum : 9^{th} to 14^{th} segment

193. A transverse section of *Pheretima* taken through the 10th segment is observed in microscope.Which of the following structures can be observed in the section ?

(1) Stomach, Dorsal blood vessel, Ventral blood vessel, Supra-oesophageal vessel, Anterior loops, Ring vessel and Micronephridia

(2) Stomach, Dorsal blood vessel, Ventral blood vessel, Lateral hearts, Ring vessel and Pharyngeal nephridia

(3) Intestine, Dorsal blood vessel, Ventral blood vessel, Lateral hearts, Ring vesel and Pharyngeal nephridia

(4) Intestine, Dorsal blood vessel, Ventral blood vessel, Supra-oesophageal vessel and Septal nephridia

194. Porphyrin of earthworm is found in:

(1) Cuticle (2) Epidermis

(3) Circular muscles (4) Longitudinal muscles

195. Tumbler is pupa of

(1) Housefly (2) Mosquito

(3) Butterfly (4) Beetle

196. Silk is obtained from

(1) Silk worm (2) Cocoon

(3) Caterpillar (4) None of these

197. Match list I with list II and choose the correct answer using the code given below:

List I	**List II**
(a) *Cryptobranchus*	(i) Hell-bender
(b) *Ambystoma*	(ii) Tiger salamander
(c) *Triton*	(iii) Cave salamander
(d) *Proteus*	(iv) European salamander

(1) a-i, b-ii, c-iii, d-iv (2) a-iv, b-iii, c-ii, d-i

(3) a-i, b-ii, c-iv, d-iii (4) a-ii, b-i, c-iii, d-iv

198. If the mouth of frog is kept open for sometime, it dies because it is unable to

(1) Eat (2) Drink

(3) Breathe (4) None of these

199. In frog the phalangeal formula for hand is

(1) 0, 2, 2, 3, 3 (2) 2, 2, 3, 3, 4

(3) 2, 2, 3, 3, 4 (4) 2, 3, 3, 3, 3

200. Halters are the modification of

(1) First pair of wings (2) First pair of legs

(3) Second pair of wings

(4) Second pair of legs

Answer

101. (3)
102. (4)
103. (1)
104. (3)
105. (2)
106. (3)
107. (4)
108. (1)
109. (2)
110. (1)
111. (3)
112. (4)
113. (3)
114. (4)
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193. (1)
194. (2)
195. (2)
196. (2)
197. (3)
198. (3)
199. (1)
200. (3)

Solution

101. If Gametophytic and Sporophytic phases are morphologically similar, this diplohaplontic life cycle is called isomorphic or monomorphic diplohaplontic life cycle. *e.g. Ectocarpus, Uiva*

103. All the members of Rhodophyceae are marine and in red colour. But *Batrachospermum* and *Harveyella* are parasitic forms and are also colourless.

104. *Buxbaumia* is saprophytic moss plant. *Radulla* is a epiphyllous bryophyte, *Ricciocarpus* is quatic and *sphagnum* grows in acidic bogs.

107. Apophysis is green, sterile, photosynthetic and bears primitive type of stomata.

108. Because Bog moss is a truemoss and is a bryophyte - *Sphagnum*. The other are clubmoss - *Lycopodium* (pteridophyte), Irishmoss. *Chondrus crispus* (Algae) and Reindeer moss-*Cladonia rangifera* (Lichen)

109. In the phenomenon of Apospory - meiosis does not take place. And it is observed in several pteridophytes.

112. Silica makes the surface rough, hence *Equisetum* is used for scouring (washing) utensils. That is why it is calles 'scouring rush'.

113. Actually sago is obtained from sago palm - *Cycas revoluta*.

116. When the embryo tier splits up into four units each of which is capable of forming the mature embryo, then the process is called cleavage polyembryony.

118. Bentham and Hooker classified dicots on the basis of number and nature of floral whorls.

121. Of all the enzymes present in a cell mitochondria account for 70%. Enzymes retain their catalytic action even after their extraction from cells. Enzymes having similar properties but different molecular weights are called isoenzymes.

122. Ribosomes, centrioles, microfilaments, microtubules, nucleolus and chromosomes are without membrane. ER, golgi bodies, vacuoles, microbodies and cilia are with single unit membrane. Plastids and mitochondria are with double membrane. Transosomes have tripple membrane.

123. In mitochondria and chloroplast electron carrier systems are different.

132. Specially in Acellular slime moulds sporangium develops a system of threads called capillitium (pl. capillitia). It expands and contracts to rupture the sporangium and liberates spores.

135. Yeasts are one celled (unicellular) eukaryotic, ascomycetaceous fungi without mycelium, called degenerative.

136. *Dialister pneumosintes* measures 0.15µ in length.

138. Budding bacteria appear like a beaded cell e.g., *Rhodomicrobium.*

139. Photolithotrophs/Photosynthetic autotrophs use inorganic electron donor such as H_2S, H_2 sulphur compound etc. They contain bacteriochlorophyll. e.g., *Chlorobium, Chromatium.*

140. In Endomycorrhizae (endotrophic mycorrhizae) the fungal partner belongs to zygomycetes/ phycomycetes.

142. Omega taxonomy considers all microscopic observations and biochemical evidences and is equivalent to neosystematics.

146. In an ascocarp, ascus is the fertile region which contain ascospores.

147. Transduction is phage-mediated genetic transfer. It was discovered by Zinder and Lederber (1952) in *Salmonella typhimurium.*

149. In *Agaricus*, secondary mycellium is long lived and present in 2n stage.

156. *Pipa* is known as Surinam toad, *Bufo* is known as toad & *Hyla* is known as tree frog.

157. Scroll valve is found in cartilaginous fishes.

163. Blood glands serve for the manufacture of blood corpuscles.

164. If nephridia is exonephric, then it will pass waste outside the body & no conservation of water will take place.

165. Utricular gland secretes innermost & middle covering of spermatophore, whereas phallic gland secretes the outermost covering.

The small tubules of utricular gland nourishes the sperm.

169. Aristotles lantern is rasping organ (masticating).

187. *Ichthyophis* is limbless amphibian whereas *Ophiosaurus* is limbless reptile.

190. In gout deposition of uric acid takes place, whereas in arthritis calcium is deposited.

195. Maggot is larva of housefly, wriggler is the larva of mosquito & catterpillar is the larva of butterfly.

196. Silk is produced / secreted by silkworm whereas silk is obtained from cocoon.