91. The bacterium *Bacillus thuringiensis* is widely used in contemporary biology as a/an
(a) indicator of water pollution
(b) insecticide
(c) agent for production of dairy products
(d) source of industrial enzyme

92. A health disorder that results from the deficiency of thyroxin in adults and characterized by
(i) a low metabolic rate
(ii) increase in body weight
(iii) tendency to retain water in tissues is
(a) hypothyroidism (b) simple goitre
(c) myxoedema (d) cretinism

93. The correct sequence of plants in a hydrosere is
(a) Oak → *Lantana* → *Scirpus* → *Pistia* → *Hydrilla* → *Volvox*
(b) *Volvox* → *Hydrilla* → *Pistia* → *Scirpus* → *Lantana* → Oak
(c) *Pistia* → *Volvox* → *Scirpus* → *Hydrilla* → Oak → *Lantana*
(d) Oak → *Lantana* → *Volvox* → *Hydrilla* → *Pistia* → *Scirpus*

94. The epithelial tissue present on the inner surface of bronchioles and fallopian tubes is
(a) cuboidal (b) glandular
(c) ciliated (d) squamous

95. Uric acid is the chief nitrogenous component of the excretory products of
(a) man (b) earthworm
(c) cockroach (d) frog

96. Tiger is not a resident, in which one of the following national park?
(a) Ranthambhor
(b) Sunderbans
(c) Gir
(d) Jim Corbett

97. When breast feeding is replaced by less nutritive food low in proteins and calories; the infants below the age of one year are likely to suffer from
(a) marasmus (b) rickets
(c) kwashiorkor (d) pellagra

98. Which one of the following correctly describes the location of some body parts in the earthworm *Pheretima*?
(a) Two pairs of accessory glands in 16-18 segments
(b) Four pairs of spermathecae in 4-7 segments
(c) One pair of ovaries attached at intersegmental septum of 14th and 15th segments
(d) Two pairs of testes in 10th and 11th segments

99. Which one of the following has haplontic life cycle?
(a) *Funaria* (b) *Polytrichum*
(c) *Ustilago* (d) Wheat

100. Which part of human brain is concerned with the regulation of body temperature?
(a) Medulla oblongata (b) Cerebellum
(c) Cerebrum (d) Hypothalamus

101. In the case of peppered moth (*Biston betularia*) the black-coloured form became dominant over the light-coloured form in England during industrial revolution. This is an example of
(a) natural selection whereby the darker forms were selected
(b) appearance of the darker coloured individuals due to very poor sunlight
(c) protective mimicry
(d) inheritance of darker colour character acquired due to the darker environment

102. The genetic defect-Adenosine Deaminase (ADA) deficiency may be cured permanently by
(a) periodic infusion of genetically engineered lymphocytes having functional ADA cDNA
(b) administering adenosine deaminase activators
(c) introducing bone marrow cells producing ADA into cells at early embryonic stages
(d) enzyme replacement therapy

103 If a live earthworm is pricked with a needle on its outer surface without damaging its gut, the fluid that comes out is
(a) excretory fluid
(b) coelomic fluid
(c) haemolymph
(d) slimy mucus

104 Point mutation involves
(a) insertion
(b) change in single base pair
(c) duplication
(d) deletion

105 In a standard ECG, which one of the following alphabets is the correct representation of the respective activity of the human heart?
(a) R-repolarisation of ventricles
(b) S-start of systole
(c) T-end of diastole
(d) P-depolarisation of the atria

106 Middle lamella is mainly composed of
(a) hemicellulose
(b) muramic acid
(c) calcium pectate
(d) phosphoglycerides

107 Which one of the following plants is monoecious?
(a) *Marchantia* (b) *Pinus*
(c) *Cycas* (d) Papaya

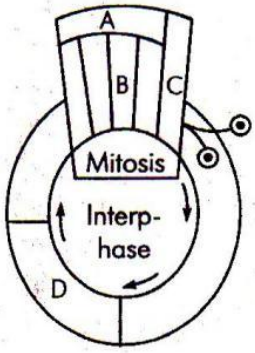
108 Plasmodesmata are
(a) lignified cemented layers between cells
(b) locomotory structures
(c) membranes connecting the nucleus with plasmalemma
(d) connections between adjacent cells

109 Aerobic respiratory pathway is appropriately termed
(a) catabolic (b) parabolic
(c) amphibolic (d) anabolic

110 Alzhimer disease in humans is associated with the deficiency of
(a) dopamine
(b) glutamic acid
(c) acetylcholine
(d) Gamma Amino Butyric Acid (GABA)

111. Compared to blood our lymph has
(a) no plasma
(b) plasma without proteins
(c) more WBCs and no RBCs
(d) more RBCs and less WBCs

112. Given below is a schematic break-up of the phases/stages of cell cycle



Which one of the following is the correct indication of the stage/phase in the cell cycle?
(a) B-Metaphase
(b) C-Karyokinesis
(c) D-Synthetic phase
(d) A-Cytokinesis

113. The most popularly known blood grouping is the ABO grouping. It is named ABO and not ABC, because 'O' in it refers to having
(a) other antigens besides A and B on RBCs
(b) over dominance of this type on the genes for A and B types
(c) one antibody only—either anti-A or anti-B on the RBCs
(d) no antigens A and B on RBCs

114. Anatomically fairly old dicotyledonous root is distinguished from the dicotyledonous stem by
(a) absence of secondary xylem
(b) absence of secondary phloem
(c) presence of cortex
(d) position of protoxylem

115. Which one of the following is commonly used in transfer of foreign DNA into crop plants?
(a) *Trichoderma harzianum*
(b) *Meloidogyne incognita*
(c) *Agrobacterium tumefaciens*
(d) *Penicillium expansum*

116. Whose experiments cracked the DNA and discovered unequivocally that a genetic code is a triplet?
(a) Nirenberg and Mathaei
(b) Hershey and Chase
(c) Morgan and Sturtevant
(d) Beadle and Tatum

117. Phylogenetic system of classification is based on
(a) evolutionary relationships
(b) morphological features
(c) chemical constituents
(d) floral characters

118. Which one of the following pairs of animal comprises 'jawless fishes'?
(a) Lampreys and eels
(b) Mackerals and rohu
(c) Lampreys and hag fishes
(d) Guppies and hag fishes

119. The cell junctions called tight, adhering and gap junctions are found in
(a) muscular tissue (b) connective tissue
(c) epithelial tissue (d) neural tissue

120. Use of anti-histamines and steroids give a quick relief from
(a) allergy (b) nausea
(c) cough (d) headache

121. What will happen if the stretch receptors of the urinary bladder wall are totally removed?
(a) Urine will not collect in the bladder
(b) Micturition will continue
(c) Urine will continue to collect normally in the bladder
(d) There will be no micturition

122. What is true about *Bt* toxin?
(a) The inactive protoxin gets converted into active form in the insect gut
(b) *Bt* protein exists as active toxin in the *Bacillus*
(c) The activated toxin enters the ovaries of the pest to sterilize it and thus prevent its multiplication
(d) The concerned *Bacillus* has antitoxins

123 DDT residues are rapidly passed through food chain causing biomagnification because DDT is
(a) lipo soluble
(b) moderately toxic
(c) non-toxic to aquatic animals
(d) water soluble

124 Steps taken by the Government of India to control air pollution include
(a) compulsory mixing of 20% ethyl alcohol with petrol and 20% biodiesel with diesel
(b) compulsory PUC (Pollution Under Control) certification of petrol driven vehicles, which tests for carbon monoxide and hydrocarbons
(c) permission to use only pure diesel with a maximum of 500 ppm sulphur as fuel for vehicles
(d) use of non-polluting Compressed Natural Gas (CNG) only as fuel by all buses and trucks

125. Palisade parenchyma is absent in leaves of
(a) *Sorghum* (b) mustard
(c) soybean (d) gram

126. Which one of the following is considered important in the development of seed habit?
(a) Dependent sporophyte
(b) Heterospory
(c) Haplontic life cycle
(d) Free-living gametophyte

127. Polyethylene glycol method is used for
(a) gene transfer without a vector
(b) biodiesel production
(c) seedless fruit production
(d) energy production from sewage

128. A person likely to develop tetanus is immunised by administering
(a) dead germs
(b) preformed antibodies
(c) wide spectrum antibiotics
(d) weakened germs

129. Which one of the following is the correct matching of the events occurring during menstrual cycle?

(a) Ovulation — LH and FSH attain peak level and sharp fall in the secretion of progesterone
(b) Proliferative phase — Rapid regeneration of myometrium and maturation of Graafian follicle
(c) Development of corpus luteum — Secretory phase and increased secretion of progesterone
(d) Menstruation — Breakdown of myometrium and ovum not fertilized

130. Globulins contained in human blood plasma are primarily involved in
(a) defence mechanisms of body
(b) osmotic balance of body fluids
(c) oxygen transport in the blood
(d) clotting of blood

131. An example of axile placentation is
(a) *Argemone* (b) *Dianthus*
(c) lemon (d) marigold

132. A young infant may be feeding entirely on mother's milk, which is white in colour but the stools, which the infant passes out is quite yellowish. What is this yellow colour due to?
(a) Intestinal juice
(b) Bile pigments passed through bile juice
(c) Undigested milk protein casein
(d) Pancreatic juice poured into duodenum

133. Which one of the following statements is correct?
(a) Patients, who had undergone surgery are given cannabinoids to relieve pain
(b) Benign tumours show the property of metastasis
(c) Heroin accelerates body functions
(d) Malignant tumours may exhibit metastasis

134. The letter T in T-lymphocyte refers to
(a) thyroid (b) thalamus
(c) tonsil (d) thymus

135. Reduction in vascular tissue, mechanical tissue and cuticle is characteristic of
(a) xerophytes (b) mesophytes
(c) epiphytes (d) hydrophytes

136. What is not true for genetic code?
(a) A codon in *m*RNA is read in a non-contiguous fashion
(b) It is nearly universal
(c) It is degenerate
(d) It is unambiguous

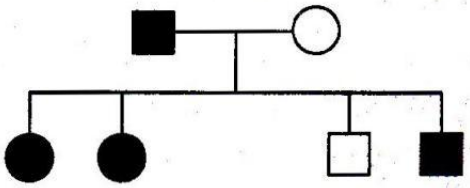
137. Which one of the following pairs of structures is correctly matched with their correct description?

	Structure	Description
(a)	Tibia and fibula	Both form parts of knee joint
(b)	Cartilage and cornea	No blood supply but do require oxygen for respiratory need
(c)	Shoulder joint and elbow joint	Ball and socket type of joint
(d)	Premolars and molars	20 in all and 3 rooted

138. Fastest distribution of some injectible material/medicine and with no risk of any kind can be achieved by injecting it into the
(a) muscles (b) arteries
(c) veins (d) lymph vessels

139. Which one of the following statements about the particular entity is true?
(a) Centromere is found in animal cells which produces aster during cell division
(b) The gene for producing insulin is present in every body cell
(c) Nucleosome is formed of nucleotides
(d) DNA consists of a core of eight histones

140. Study the pedigree chart of a certain family given below and select the correct conclusion which can be drawn for the character.



(a) The female parent is heterozygous
(b) The parents could not have had a normal daughter for this character
(c) The trait under study could not be colour blindness
(d) The male parent is homozygous dominant

141. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statement is not correct during the process of nitrogen fixation?
(a) Leghaemoglobin scavenges oxygen and is pinkish in colour
(b) Nodules act as a site for nitrogen fixation
(c) The enzyme nitrogenase catalyses the conversion of atmospheric N_2 to NH_3
(d) Nitrogenase is insensitive to oxygen

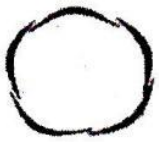
142. Which one of the following is a xerophytic plant in which the stem is modified into the flat green and succulent structure?
(a) *Opuntia* (b) *Casuarina*
(c) *Hydrilla* (d) *Acacia*

143. Which of the following is used in gene cloning?
(a) Nucleoids (b) Lomasomes
(c) Mesosomes (d) Plasmids

144. When domestic sewage mixes with river water
(a) small animals like rats will die after drinking river water
(b) the increased microbial activity releases micronutrients such as iron
(c) the increased microbial activity uses up dissolved oxygen
(d) the river water is still suitable for drinking as impurities are only about 0.1%

145. Given below are four statements (A – D) each with one or two blanks. Select the option which correctly fills up the blanks in two statements.
(A) Wings of butterfly and birds look alike and are the results of ——(i)—— evolution.
(B) Miller showed that CH_4, H_2, NH_3 and ——(i)——, when exposed to electric discharge in a flask resulted information of ——(ii)——.
(C) Vermiform appendix is a ——(i)——organ and an——(ii)—— evidence of evolution.
(D) According to Darwin evolution took place due to ——(i)——and ——(ii)——of the fittest.
(a) (D)—(i) small variations, (ii) survival, (A)—(i) convergent
(b) (A)—(i) convergent, (B)—(i) oxygen, (ii) nucleosides
(c) (B)—(i) water vapour, (ii) amino acids (C)—(i) rudimentary, (ii) anatomical
(d) (C)—(i) vestigial, (ii) anatomical (D)—(i) mutations, (ii) multiplication

146. Aestivation of petals in the flower of cotton is correctly shown in

(a) 
(b) 
(c) 
(d) 

147. In which one of the following organism, its excretory organs are correctly stated?
(a) Humans — Kidneys, sebaceous glands and tear glands
(b) Earthworm — Pharyngeal, integumentary and septal nephridia
(c) Cockroach — Malpighian tubules and enteric caeca
(d) Frog — Kidneys, skin and buccal epithelium

148. The most apparent change during the evolutionary history of *Homo sapiens* is traced in
(a) loss of body hair
(b) walking upright
(c) shortening of the jaws
(d) remarkable increase in the brain size

149. Which one of the following is now being commercially produced by biotechnological procedures?
(a) Nicotine (b) Morphine
(c) Quinine (d) Insulin

150. The correct floral formula of soybean is
(a) % ♂ ♀ $K_{(5)}C_{1+(2)+2}A_{(9)+1}G_{\overline{1}}$
(b) % ♂ ♀ $K_{(5)}C_{1+(2)+2}A_{(9)+1}G_{\underline{1}}$
(c) % ♂ ♀ $K_{(5)}C_{1+2+(2)}A_{(9)+1}G_{\underline{1}}$
(d) % ♂ ♀ $K_{(5)}C_{1+2+(2)}A_{(9)+1}G_{\underline{1}}$

151. If for some reason the parietal cells of the gut epithelium become partially non-functional, what is likely to happen?
(a) The pancreatic enzymes and specially the trypsin and lipase will not work efficiently
(b) The pH of stomach will fall abruptly
(c) Steapsin will be more effective
(d) Proteins will not be adequately hydrolysed by pepsin into proteoses and peptones

152. Which one of the following is most appropriately defined?
(a) Host is an organism, which provides food to another organism
(b) Amensalism is a relationship in which one species is benefited whereas the other is unaffected
(c) Predator is an organism that catches and kills other organism for food
(d) Parasite is an organism, which always lives inside the body of other organism and may kill it

153. Read the following four statements, A, B, C and D and select the right option having both correct statements.
A. Z secheme of light reaction takes place in presence of PS-I only.
B. Only PS-I is functional in cyclic photophosphorylation.
C. Cyclic photophosphorylation results into synthesis of ATP and $NADPH_2$.
D. Stroma lamellae lack PS-II as well as NADP.
(a) B and D (b) A and B
(c) B and C (d) C and D

154. Which one of the following techniques is safest for the detection of cancer?
(a) Magnetic Resonance Imaging (MRI)
(b) Radiography (X-ray)
(c) Computed Tomography (CT)
(d) Histopathological Studies

155. Signals from fully developed foetus and placenta ultimately lead to parturition which requires the release of
(a) oestrogen from placenta
(b) oxytocin from maternal pituitary
(c) oxytocin from foetal pituitary
(d) relaxin from placenta

156. Select the correct matching of a hormone its source and function.

	Hormone	Source	Function
(a)	Vasopressin	Posterior pituitary	Increases loss of water through urine
(b)	Norepinephrine	Adrenal medulla	Increases heart beat, rate of respiration and alertness
(c)	Glucagon	Beta-cells of Islets of Langerhans	Stimulates glycogenolysis
(d)	Prolactin	Posterior pituitary	Regulates growth of mammary glands and milk formation in females

157. In eukaryotic cell transcription, RNA splicing and RNA capping take place inside the
(a) ribosomes (b) nucleus
(c) dictyosomes (d) ER

158. Given below are four statements (A-D) regarding human blood circulatory system
A. Arteries are thick-walled and have narrow lumen as compared to veins.
B. Angina is acute chest pain when the blood circulation to the brain is reduced.
C. Persons with blood group-AB can donate blood to any person with any blood group under ABO system.
D. Calcium ions play a very important role in blood clotting.
Which two of the above statements are correct?
(a) A and D (b) A and B
(c) B and C (d) C and D

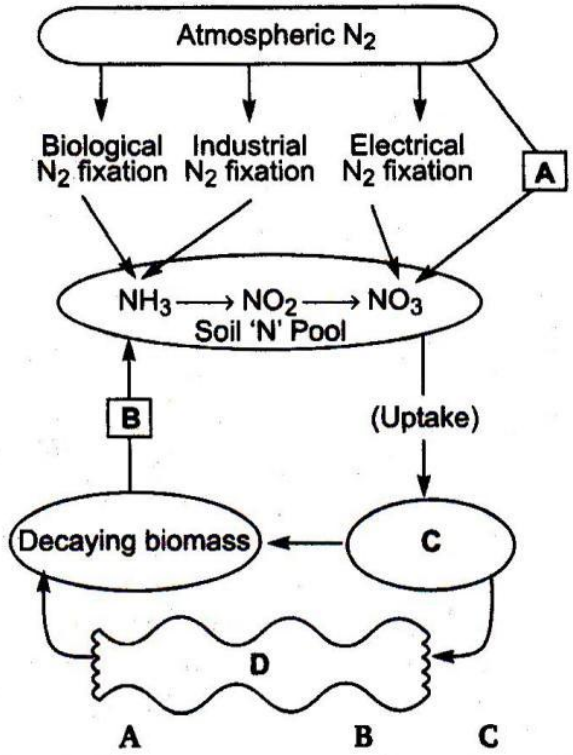
159. In human female, the blastocyst
(a) forms placenta even before implantation
(b) gets implanted into uterus three days after ovulation
(c) gets nutrition from uterine endometrial secretion only after implantation
(d) gets implanted in endometrium by the trophoblast cells

160. The haemoglobin content per 100 mL of blood of a normal healthy human adult is
(a) 5-11 g (b) 25-30 g
(c) 17-20g (d) 12-16 g

161. An example of endomycorrhiza is
(a) *Nostoc* (b) *Glomus*
(c) *Agaricus* (d) *Rhizobium*

162. One of the commonly used plant growth hormone in tea plantations is
(a) ethylene
(b) abscissic acid
(c) zeatin
(d) indole-3-acetic acid

163. Study the cycle shown below and select the option which gives correct words for all the four blanks A, B, C and D.



	A	B	C	D
(a)	Nitrification	Ammonification	Animals	Plants
(b)	Denitrification	Ammonification	Plants	Animals
(c)	Nitrification	Denitrification	Animals	Plants
(d)	Denitrification	Nitrification	Plants	Animals

164. Jaundice is a disorder of
(a) excretory system (b) skin and eyes
(c) digestive system (d) circulatory system

165. Kranz anatomy is one of the characteristics of the leaves of
(a) potato (b) wheat
(c) sugarcane (d) mustard

166. In *Antirrhinum*, two plants with pink flowers were hybridized. The F_1 plants produced red, pink and white flowers in the proportion of 1 red, 2 pink and 1 white. What could be the genotype of the two plants used for hybridization? Red flower colour is determined by RR, and white by rr genes.
(a) rrrr (b) RR
(c) Rr (d) rr

167. Transport of food material in higher plants takes place through
(a) companion cells (b) transfusion tissue
(c) tracheids (d) sieve elements

168. Which one of the following is monoecious?
(a) *Marchantia* (b) *Cycas*
(c) *Pinus* (d) Date palm

169. A cross in which an organism showing a dominant phenotype is crossed with the receseive parent in order to know its genotype is called
(a) monohybrid cross
(b) back cross
(c) test cross
(d) dihybrid cross

170. The Indian rhinoceros is a natural inhabitant of which one of the Indian states?
(a) Uttarakhand
(b) Uttar Pradesh
(c) Himachal Pradesh
(d) Asom

171. Black (stem) rust of wheat is caused by
(a) *Alternaria solani*
(b) *Ustilago nuda*
(c) *Puccinia graminis*
(d) *Xanthomonas oryzae*

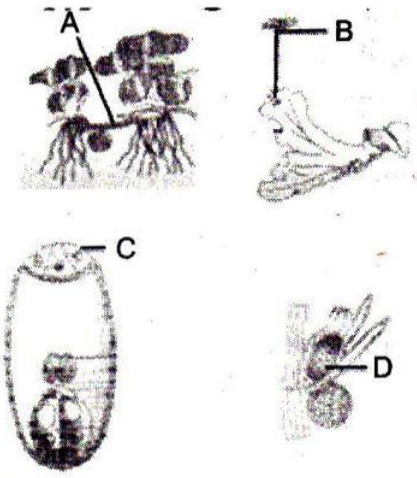
172. Secretions from which one of the following are rich in fructose, calcium and some enzymes?
(a) Male accessory glands
(b) Liver
(c) Pancreas
(d) Salivary glands

173. ABO blood grouping is controlled by gene I, which has three alleles and show codominance. There are six genotypes. How many phenotypes in all are possible?
(a) Six (b) Three
(c) Four (d) Five

174. Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?
(a) Enzymes require optimum pH for maximal activity
(b) Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures 80°-90°C
(c) Enzymes are highly specific
(d) Most enzymes are proteins but some are lipids

175. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called
(a) thylakoid
(b) endoplasmic reticulum
(c) plasmalemma
(d) cytoskeleton

176. Examine the figures (A-D) given below and select the right option out of a-d, in which all the four structures A, B, C and D are identified correctly.



	A	B	C	D
(a)	Rhi-zome	Sporangi ophore	Polar cell	Clobule
(b)	Runner	Archegon ophore	Synergid	Antheridiu m
(c)	Offset	Antheridi ophore	Antipodals	Oogonium
(d)	Sucker	Seta	Megaspore mother cell	Gemma cup

177. Root development is promoted by
(a) abscisic acid (b) auxin
(c) gibberellin (d) ethylene

178. Consider the following four statements A, B, C and D and select the right option for two correct statements.
A. In vexillary aestivation, the large posterior petal is called-standard, two lateral ones are wings and two small anterior petals are termed keel.
B. The floral formula for Liliaceae is
$\oplus ♀♂ P_{3+3} A_{3+3} G_{\bar{3}}$
C. In pea flower, the stamens are monadelphous.
D. The floral formula for Solanaceae is
$\oplus ♀♂ K_{(3)}C_{(3)} A_{(3)} + G_{(2)}$
(a) A and C
(b) A and B
(c) B and C
(d) C and D

179. In genetic engineering, a DNA segment (gene) of interest, is transferred to the host cell through a vector. Consider the following four agents (A-D) in this regard and select the correct option about which one or more of these can be used as a vector/vectors.
A. A bacterium
B. Plasmid
C. Plasmodium
D. Bacteriophage
(a) A, B and D only (b) A only
(c) A and C only (d) B and D only

180. Which one of the following cannot be used for preparation of vaccines against plague?
(a) Formalin-inactivated suspensions of virulent bacteria
(b) Avirulent live bacteria
(c) Synthetic capsular polysaccharide material
(d) Heat-killed suspensions of virulent bacteria