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NEET (UG) 2023 — Biology (Botany + Zoology)

Exam date: 7 May 2023 • Test Booklet Code: E1 • Questions 101–200 (100 questions; attempt 90) • +4 / –1

Questions as they appeared in NEET (UG) 2023 conducted by NTA. Answers verified by competitorspoint.com. Explanations by competitorspoint.com.

Botany — Section A (Q. 101–135, all compulsory)

101. Given below are two statements : One labelled as Assertion A and the other labelled as Reason R: Assertion A : The first stage of gametophyte in the life cycle of moss is protonema stage. Reason R : Protonema develops directly from spores produced in capsule.

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

(1) Both A and R are correct and R is the correct explanation of A
(2) Both A and R are correct but R is NOT the correct explanation of A
(3) A is correct but R is not correct
(4) A is not correct but R is correct

102. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are :

(1) Synergids, Primary endosperm nucleus and zygote
(2) Antipodals, synergids, and primary endosperm nucleus
(3) Synergids, Zygote and Primary endosperm nucleus
(4) Synergids, antipodals and Polar nuclei

103. Movement and accumulation of ions across a membrane against their concentration gradient can be explained by

(1) Osmosis **(2)** Facilitated Diffusion
(3) Passive Transport **(4)** Active Transport

104. Large, colourful, fragrant flowers with nectar are seen in

(1) Insect pollinated plants **(2)** Bird pollinated plants
(3) Bat pollinated plants **(4)** Wind pollinated plants

105. The phenomenon of pleiotropism refers to

(1) Presence of several alleles of a single gene controlling a single crossover
(2) Presence of two alleles, each of the two genes controlling a single trait
(3) A single gene affecting multiple phenotypic expression
(4) More than two genes affecting a single character

106. Which hormone promotes internode/petiole elongation in deep water rice?

(1) GA_3 **(2)** Kinetin
(3) Ethylene **(4)** 2, 4-D

107. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?

(1) Habitat loss and fragmentation
(2) Over exploitation for economic gain
(3) Alien species invasions
(4) Co-extinctions

108. Upon exposure to UV radiation, DNA stained with ethidium bromide will show

(1) Bright red colour **(2)** Bright blue colour
(3) Bright yellow colour **(4)** Bright orange colour

109. Which micronutrient is required for splitting of water molecule during photosynthesis?

(1) Manganese **(2)** Molybdenum
(3) Magnesium **(4)** Copper

110. Axile placentation is observed in

(1) Mustard, Cucumber and Primrose
(2) China rose, Beans and Lupin
(3) Tomato, Dianthus and Pea
(4) China rose, Petunia and Lemon

111. The process of appearance of recombination nodules occurs at which sub-stage of prophase I in meiosis?

(1) Zygotene **(2)** Pachytene
(3) Diplotene **(4)** Diakinesis

112. The reaction centre in PS II has an absorption maxima at

(1) 680 nm **(2)** 700 nm
(3) 660 nm **(4)** 780 nm

113. Unequivocal proof that DNA is the genetic material was first proposed by

(1) Frederick Griffith
(2) Alfred Hershey and Martha Chase
(3) Avery, MacLeod and McCarthy
(4) Wilkins and Franklin

114. Among eukaryotes, replication of DNA takes place in :

(1) M phase **(2)** S phase
(3) G_1 phase **(4)** G_2 phase

115. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as

(1) Differentiation **(2)** Dedifferentiation
(3) Development **(4)** Senescence

116. Cellulose does not form blue colour with Iodine because

(1) It is a disaccharide
(2) It is a helical molecule
(3) It does not contain complex helices and hence cannot hold iodine molecules
(4) It breaks down when iodine reacts with it

117. Spraying of which of the following phytohormone on juvenile conifers helps hastening the maturity period, that leads early seed production?

(1) Indole-3-butyric Acid **(2)** Gibberellic Acid
(3) Zeatin **(4)** Abscisic Acid

118. Given below are two statements :

Statement I : The forces generated by transpiration can lift a xylem-sized column of water over 130 meters height.

Statement II : Transpiration cools leaf surfaces sometimes 10 to 15 degrees by evaporative cooling.

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

(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct

119. Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabaceae but not found in Solanaceae or Liliaceae.

(1) Diadelphous and Dithecous anthers
(2) Polyadelphous and epipetalous stamens
(3) Monoadelphous and Monothecous anthers
(4) Epiphyllous and Dithecous anthers

120. Expressed Sequence Tags (ESTs) refers to

(1) All genes that are expressed as RNA.
(2) All genes that are expressed as proteins.
(3) All genes whether expressed or unexpressed.
(4) Certain important expressed genes.

121. Identify the correct statements:

A. Detritivores perform fragmentation.
B. The humus is further degraded by some microbes during mineralization.
C. Water soluble inorganic nutrients go down into the soil and get precipitated by a process called leaching.
D. The detritus food chain begins with living organisms.
E. Earthworms break down detritus into smaller particles by a process called catabolism.

Choose the correct answer from the options given below:

(1) A, B, C only **(2)** B, C, D only
(3) C, D, E only **(4)** D, E, A only

122. The thickness of ozone in a column of air in the atmosphere is measured in terms of :

(1) Dobson units **(2)** Decibels
(3) Decameter **(4)** Kilobase

123. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R : Assertion A : Late wood has fewer xylary elements with narrow vessels. Reason R : Cambium is less active in winters.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A
(2) Both A and R are true but R is NOT the correct explanation of A
(3) A is true but R is false
(4) A is false but R is true

124. Which of the following stages of meiosis involves division of centromere?

(1) Metaphase I **(2)** Metaphase II
(3) Anaphase II **(4)** Telophase

125. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year

(1) 1985 **(2)** 1992
(3) 1986 **(4)** 2002

126. How many ATP and $NADPH_2$ are required for the synthesis of one molecule of Glucose during Calvin cycle?

(1) 12 ATP and 12 $NADPH_2$ **(2)** 18 ATP and 12 $NADPH_2$
(3) 12 ATP and 16 $NADPH_2$ **(4)** 18 ATP and 16 $NADPH_2$

127. In the equation GPP – R = NPP, GPP is Gross Primary Productivity, NPP is Net Primary Productivity and R here is _____.

(1) Photosynthetically active radiation
(2) Respiratory quotient
(3) Respiratory loss
(4) Reproductive allocation

128. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out

(1) RNA **(2)** DNA
(3) Histones **(4)** Polysaccharides

129. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?

(1) Transcription of rRNAs (28S, 18S and 5.8S)
(2) Transcription of tRNA, 5S rRNA and snRNA
(3) Transcription of precursor of mRNA
(4) Transcription of only snRNAs

130. What is the function of tassels in the corn cob?

(1) To attract insects **(2)** To trap pollen grains
(3) To disperse pollen grains **(4)** To protect seeds

131. Identify the pair of heterosporous pteridophytes among the following :

(1) Lycopodium and Selaginella **(2)** Selaginella and Salvinia
(3) Psilotum and Salvinia **(4)** Equisetum and Salvinia

132. In gene gun method used to introduce alien DNA into host cells, microparticles of _____ metal are used.

(1) Copper **(2)** Zinc
(3) Tungsten or gold **(4)** Silver

133. Given below are two statements :

Statement I : Endarch and exarch are the terms often used for describing the position of secondary xylem in the plant body.

Statement II : Exarch condition is the most common feature of the root system.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is correct but Statement II is false
(4) Statement I is incorrect but Statement II is true

134. Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on chromosome, was used for the first time by

(1) Thomas Hunt Morgan **(2)** Sutton and Boveri
(3) Alfred Sturtevant **(4)** Henking

135. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R : Assertion A : ATP is used at two steps in glycolysis. Reason R : First ATP is used in converting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1, 6-diphosphate.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true but R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

Botany — Section B (Q. 136–150, attempt any 10)

136. Which one of the following statements is NOT correct?

(1) The micro-organisms involved in biodegradation of organic matter in a sewage polluted water body consume a lot of oxygen causing the death of aquatic organisms
(2) Algal blooms caused by excess of organic matter in water improve water quality and promote fisheries
(3) Water hyacinth grows abundantly in eutrophic water bodies and leads to an imbalance in the ecosystem dynamics of the water body
(4) The amount of some toxic substances of industrial waste water increases in the organisms at successive trophic levels

137. How many different proteins does the ribosome consist of?

(1) 80 **(2)** 60
(3) 40 **(4)** 20

138. Which of the following statements are correct about Klinefelter's Syndrome?

A. This disorder was first described by Langdon Down (1866).
B. Such an individual has overall masculine development. However, the feminine development is also expressed.
C. The affected individual is short statured.
D. Physical, psychomotor and mental development is retarded.
E. Such individuals are sterile.

Choose the correct answer from the options given below:

(1) A and B only **(2)** C and D only
(3) B and E only **(4)** A and E only

139. Match List I with List II :

List I		List II	
A.	Oxidative decarboxylation	**I.**	Citrate synthase
B.	Glycolysis	**II.**	Pyruvate dehydrogenase
C.	Oxidative phosphorylation	**III.**	Electron transport system
D.	Tricarboxylic acid cycle	**IV.**	EMP pathway

Choose the correct answer from the options given below :

(1) A – III, B – IV, C – II, D – I
(2) A – II, B – IV, C – I, D – III
(3) A – III, B – I, C – II, D – IV
(4) A – II, B – IV, C – III, D – I

140. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R : Assertion A : A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem. Reason R : Internode of the shoot gets condensed to produce different floral appendages laterally at successive node instead of leaves.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A
(2) Both A and R are true but R is NOT the correct explanation of A
(3) A is true but R is false
(4) A is false but R is true

141. Given below are two statements : One labelled as Assertion A and the other labelled as Reason R : Assertion A : In gymnosperms the pollen grains are released from the microsporangium and carried by air currents. Reason R : Air currents carry the pollen grains to the mouth of the archegonia where the male gametes are discharged and pollen tube is not formed.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A
(2) Both A and R are true but R is NOT the correct explanation of A
(3) A is true but R is false
(4) A is false but R is true

142. Match List I with List II :

List I		List II	
A.	Cohesion	**I.**	More attraction in liquid phase
B.	Adhesion	**II.**	Mutual attraction among water molecules
C.	Surface tension	**III.**	Water loss in liquid phase
D.	Guttation	**IV.**	Attraction towards polar surfaces

Choose the correct answer from the options given below :

(1) A – II, B – IV, C – I, D – III
(2) A – IV, B – III, C – II, D – I
(3) A – III, B – I, C – IV, D – II
(4) A – II, B – I, C – IV, D – III

143. Which of the following combinations is required for chemiosmosis?

(1) Membrane, proton pump, proton gradient, ATP synthase
(2) Membrane, proton pump, proton gradient, NADP synthase
(3) Proton pump, electron gradient, ATP synthase
(4) Proton pump, electron gradient, NADP synthase

144. Malonate inhibits the growth of pathogenic bacteria by inhibiting the activity of

(1) Succinic dehydrogenase **(2)** Amylase
(3) Lipase **(4)** Dinitrogenase

145. Identify the correct statements:

A. Lenticels are the lens-shaped openings permitting the exchange of gases.
B. Bark formed early in the season is called hard bark.
C. Bark is a technical term that refers to all tissues exterior to vascular cambium.
D. Bark refers to periderm and secondary phloem.
E. Phellogen is single-layered in thickness.

Choose the correct answer from the options given below:

(1) B, C and E only **(2)** A and D only
(3) A, B and D only **(4)** B and C only

146. Match List I with List II :

List I		List II	
A.	M Phase	**I.**	Proteins are synthesized
B.	G_2 Phase	**II.**	Inactive phase
C.	Quiescent stage	**III.**	Interval between mitosis and initiation of DNA replication
D.	G_1 Phase	**IV.**	Equational division

Choose the correct answer from the options given below :

(1) A-III, B-II, C-IV, D-I **(2)** A-IV, B-II, C-I, D-III
(3) A-IV, B-I, C-II, D-III **(4)** A-II, B-IV, C-I, D-III

147. Match List I with List II :

List I (Interaction)		List II (Species A and B)	
A.	Mutualism	**I.**	+(A), 0(B)
B.	Commensalism	**II.**	–(A), 0(B)
C.	Amensalism	**III.**	+(A), –(B)
D.	Parasitism	**IV.**	+(A), +(B)

Choose the correct answer from the options given below:

(1) A-IV, B-II, C-I, D-III **(2)** A-IV, B-I, C-II, D-III
(3) A-IV, B-III, C-I, D-II **(4)** A-III, B-I, C-IV, D-II

148. Given below are two statements:

Statement I : Gause's 'Competitive Exclusion Principle' states that two closely related species competing for the same resources cannot co-exist indefinitely and competitively inferior one will be eliminated eventually.

Statement II : In general, carnivores are more adversely affected by competition than herbivores.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is correct but Statement II is false.
(4) Statement I is incorrect but Statement II is true.

149. Match List I with List II:

List I		List II	
A.	Iron	**I.**	Synthesis of auxin
B.	Zinc	**II.**	Component of nitrate reductase
C.	Boron	**III.**	Activator of catalase
D.	Molybdenum	**IV.**	Cell elongation and differentiation

Choose the correct answer from the options given below:

(1) A-III, B-II, C-I, D-IV **(2)** A-II, B-III, C-IV, D-I
(3) A-III, B-I, C-IV, D-II **(4)** A-II, B-IV, C-I, D-III

150. Main steps in the formation of Recombinant DNA are given below. Arrange these steps in a correct sequence.

A. Insertion of recombinant DNA into the host cell
B. Cutting of DNA at specific location by restriction enzyme
C. Isolation of desired DNA fragment
D. Amplification of gene of interest using PCR

Choose the correct answer from the options given below :

(1) B, C, D, A **(2)** C, A, B, D
(3) C, B, D, A **(4)** B, D, A, C

Zoology — Section A (Q. 151–185, all compulsory)

151. Match List I with List II.

List I		List II	
A.	Vasectomy	**I.**	Oral method
B.	Coitus interruptus	**II.**	Barrier method
C.	Cervical caps	**III.**	Surgical method
D.	Saheli	**IV.**	Natural method

Choose the correct answer from the options given below:

(1) A-III, B-I, C-IV, D-II **(2)** A-III, B-IV, C-II, D-I
(3) A-II, B-III, C-I, D-IV **(4)** A-IV, B-II, C-I, D-III

152. Given below are two statements:

Statement I: Vas deferens receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct.

Statement II: The cavity of the cervix is called cervical canal which along with vagina forms birth canal.

In the light of the above statements, choose the correct answer from the options given below:

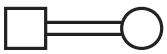
(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is correct but Statement II is false.
(4) Statement I is incorrect but Statement II is true.

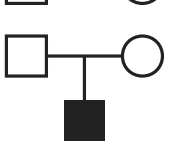
153. Which of the following statements is correct?

(1) Eutrophication refers to increase in domestic sewage and waste water in lakes.
(2) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels.
(3) Presence of large amount of nutrients in water restricts 'Algal Bloom'
(4) Algal Bloom decreases fish mortality

154. Which one of the following symbols represents mating between relatives in human pedigree analysis?

(1) 

(2) 

(3) 

(4) 

155. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly?

(1) Genital herpes **(2)** Gonorrhoea
(3) Hepatitis-B **(4)** HIV Infection

156. Match List I with List II.

List I		List II	
A.	Heroin	**I.**	Effect on cardiovascular system
B.	Marijuana	**II.**	Slow down body function
C.	Cocaine	**III.**	Painkiller
D.	Morphine	**IV.**	Interfere with transport of dopamine

Choose the correct answer from the options given below:

(1) A-II, B-I, C-IV, D-III **(2)** A-I, B-II, C-III, D-IV
(3) A-IV, B-III, C-II, D-I **(4)** A-III, B-IV, C-I, D-II

157. Match List I with List II.

List I (Type of Joint)		List II (Found between)	
A.	Cartilaginous Joint	**I.**	Between flat skull bones
B.	Ball and Socket Joint	**II.**	Between adjacent vertebrae in vertebral column
C.	Fibrous Joint	**III.**	Between carpal and metacarpal of thumb
D.	Saddle Joint	**IV.**	Between Humerus and Pectoral girdle

Choose the correct answer from the options given below:

(1) A-III, B-I, C-II, D-IV **(2)** A-II, B-IV, C-I, D-III
(3) A-I, B-IV, C-III, D-II **(4)** A-II, B-IV, C-III, D-I

158. Given below are two statements:

Statement I: A protein is imagined as a line, the left end represented by first amino acid (C-terminal) and the right end represented by last amino acid (N-terminal).

Statement II: Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits of β type).

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false.
(3) Statement I is true but Statement II is false.
(4) Statement I is false but Statement II is true.

159. Which of the following are NOT considered as the part of endomembrane system?

A. Mitochondria
B. Endoplasmic reticulum
C. Chloroplasts
D. Golgi complex
E. Peroxisomes

Choose the most appropriate answer from the options given below:

(1) B and D only **(2)** A, C and E only
(3) A and D only **(4)** A, D and E only

160. Given below are two statements:

Statement I: RNA mutates at a faster rate.

Statement II: Viruses having RNA genome and shorter life span mutate and evolve faster.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is true but Statement II is false.
(4) Statement I is false but Statement II is true.

161. Match List I with List II.

List I		List II	
A.	CCK	**I.**	Kidney
B.	GIP	**II.**	Heart
C.	ANF	**III.**	Gastric gland
D.	ADH	**IV.**	Pancreas

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-II, D-I **(2)** A-III, B-II, C-IV, D-I
(3) A-II, B-IV, C-I, D-III **(4)** A-IV, B-II, C-III, D-I

162. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R. Assertion A: Endometrium is necessary for implantation of blastocyst. Reason R: In the absence of fertilization, the corpus luteum degenerates that causes disintegration of endometrium.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true but R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

163. Match List I with List II.

List I		List II	
A.	Ringworm	**I.**	Haemophilus influenzae
B.	Filariasis	**II.**	Trichophyton
C.	Malaria	**III.**	Wuchereria bancrofti
D.	Pneumonia	**IV.**	Plasmodium vivax

Choose the correct answer from the options given below:

(1) A-II, B-III, C-IV, D-I **(2)** A-II, B-III, C-I, D-IV
(3) A-III, B-II, C-I, D-IV **(4)** A-III, B-II, C-IV, D-I

164. Given below are two statements :

Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is true but Statement II is false.
(4) Statement I is false but Statement II is true.

165. Match List I with List II.

List I		List II	
A.	Taenia	**I.**	Nephridia
B.	Paramoecium	**II.**	Contractile vacuole
C.	Periplaneta	**III.**	Flame cells
D.	Pheretima	**IV.**	Urecose gland

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV **(2)** A-I, B-II, C-IV, D-III
(3) A-III, B-II, C-IV, D-I **(4)** A-II, B-I, C-IV, D-III

166. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatment?

(1) Recombinant DNA Technology
(2) Serum and Urine analysis
(3) Polymerase Chain Reaction (PCR) technique
(4) Enzyme Linked Immuno-Sorbent Assay (ELISA) technique

167. Match List I with List II.

List I (Interacting species)		List II (Name of interaction)	
A.	A Leopard and a Lion in a forest/grassland	**I.**	Competition
B.	A Cuckoo laying egg in a Crow's nest	**II.**	Brood parasitism
C.	Fungi and root of a higher plant in Mycorrhizae	**III.**	Mutualism
D.	A cattle egret and a Cattle in a field	**IV.**	Commensalism

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV **(2)** A-I, B-II, C-IV, D-III
(3) A-III, B-IV, C-I, D-II **(4)** A-II, B-III, C-I, D-IV

168. Given below are two statements:

Statement I: Ligaments are dense irregular tissue.

Statement II: Cartilage is dense regular tissue.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Statement I is false but Statement II is true

169. Given below are two statements:

Statement I: In prokaryotes, the positively charged DNA is held with some negatively charged proteins in a region called nucleoid.

Statement II: In eukaryotes, the negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is correct but Statement II is false.
(4) Statement I is incorrect but Statement II is true.

170. Match List I with List II with respect to human eye.

List I		List II	
A.	Fovea	**I.**	Visible coloured portion of eye that regulates diameter of pupil.
B.	Iris	**II.**	External layer of eye formed of dense connective tissue.
C.	Blind spot	**III.**	Point of greatest visual acuity or resolution.
D.	Sclera	**IV.**	Point where optic nerve leaves the eyeball and photoreceptor cells are absent.

Choose the correct answer from the options given below:

(1) A-III, B-I, C-IV, D-II **(2)** A-IV, B-III, C-II, D-I
(3) A-I, B-IV, C-III, D-II **(4)** A-II, B-I, C-III, D-IV

171. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.

(1) Tasmanian wolf, Bobcat, Marsupial mole
(2) Numbat, Spotted cuscus, Flying phalanger
(3) Mole, Flying squirrel, Tasmanian tiger cat
(4) Lemur, Anteater, Wolf

172. Which of the following statements are correct regarding female reproductive cycle?

A. In non-primate mammals cyclical changes during reproduction are called oestrus cycle.
B. First menstrual cycle begins at puberty and is called menopause.
C. Lack of menstruation may be indicative of pregnancy.
D. Cyclic menstruation extends between menarche and menopause.

Choose the most appropriate answer from the options given below.

(1) A and D only **(2)** A and B only
(3) A, B and C only **(4)** A, C and D only

173. Vital capacity of lung is _____.

(1) IRV + ERV **(2)** IRV + ERV + TV + RV
(3) IRV + ERV + TV – RV **(4)** IRV + ERV + TV

174. Match List I with List II.

List I		List II	
A.	P-wave	**I.**	Beginning of systole
B.	Q-wave	**II.**	Repolarisation of ventricles
C.	QRS complex	**III.**	Depolarisation of atria
D.	T-wave	**IV.**	Depolarisation of ventricles

Choose the correct answer from the options given below:

(1) A-III, B-I, C-IV, D-II **(2)** A-IV, B-III, C-II, D-I
(3) A-II, B-IV, C-I, D-III **(4)** A-I, B-II, C-III, D-IV

175. Given below are two statements: one is labelled as Assertion A and other is labelled as Reason R.
Assertion A : Amniocentesis for sex determination is one of the strategies of Reproductive and Child Health Care Programme.
Reason R : Ban on amniocentesis checks increasing menace of female foeticide.

In the light of the above statements, choose the correct answer from the options given below.

(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true and R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

176. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by

(1) Sphincter of Oddi
(2) Ileo-caecal valve
(3) Gastro-oesophageal sphincter
(4) Pyloric sphincter

177. Match List I with List II.

List I		List II	
A.	Gene 'a'	**I.**	β-galactosidase
B.	Gene 'y'	**II.**	Transacetylase
C.	Gene 'i'	**III.**	Permease
D.	Gene 'z'	**IV.**	Repressor protein

Choose the correct answer from the options given below:

(1) A-II, B-I, C-IV, D-III **(2)** A-II, B-III, C-IV, D-I
(3) A-III, B-IV, C-I, D-II **(4)** A-III, B-I, C-IV, D-II

178. Match List I with List II.

List I (Cells)		List II (Secretion)	
A.	Peptic cells	**I.**	Mucus
B.	Goblet cells	**II.**	Bile juice
C.	Oxyntic cells	**III.**	Proenzyme pepsinogen
D.	Hepatic cells	**IV.**	HCl and intrinsic factor for absorption of vitamin B_{12}

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-II, D-I **(2)** A-II, B-I, C-III, D-IV
(3) A-III, B-I, C-IV, D-II **(4)** A-II, B-IV, C-I, D-III

179. Which of the following functions is carried out by cytoskeleton in a cell?

(1) Nuclear division **(2)** Protein synthesis
(3) Motility **(4)** Transportation

180. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R. Assertion A: Nephrons are of two types: Cortical & Juxta medullary, based on their relative position in cortex and medulla. Reason R: Juxta medullary nephrons have short loop of Henle whereas, cortical nephrons have longer loop of Henle.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true but R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

181. Given below are two statements:

Statement I: Electrostatic precipitator is most widely used in thermal power plant

Statement II: Electrostatic precipitator in thermal power plant removes ionising radiations

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

(1) Both Statement I and Statement II are correct.
(2) Both Statement I and Statement II are incorrect.
(3) Statement I is correct but Statement II is incorrect.
(4) Statement I is incorrect but Statement II is correct.

182. Broad palm with single palm crease is visible in a person suffering from

(1) Down's syndrome **(2)** Turner's syndrome
(3) Klinefelter's syndrome **(4)** Thalassemia

183. Radial symmetry is NOT found in adults of phylum

(1) Ctenophora **(2)** Hemichordata
(3) Coelenterata **(4)** Echinodermata

184. In which blood corpuscles, the HIV undergoes replication and produces progeny viruses?

(1) T_H cells **(2)** B-lymphocytes
(3) Basophils **(4)** Eosinophils

185. Which of the following is not a cloning vector?

(1) BAC **(2)** YAC
(3) pBR322 **(4)** Probe

Zoology — Section B (Q. 186–200, attempt any 10)

186. Match List I with List II.

List I		List II	
A.	Logistic growth	**I.**	Unlimited resource availability condition
B.	Exponential growth	**II.**	Limited resource availability condition
C.	Expanding age pyramid	**III.**	The percent individuals of pre-reproductive age is largest followed by reproductive and post-reproductive age groups
D.	Stable age pyramid	**IV.**	The percent individuals of pre-reproductive and reproductive age groups are same

Choose the correct answer from the options given below:

(1) A-II, B-I, C-III, D-IV **(2)** A-II, B-III, C-I, D-IV
(3) A-II, B-IV, C-I, D-III **(4)** A-II, B-IV, C-III, D-I

187. Select the correct statements with reference to chordates.

A. Presence of a mid-dorsal, solid and double nerve cord.
B. Presence of closed circulatory system.
C. Presence of paired pharyngeal gill slits.
D. Presence of dorsal heart
E. Triploblastic pseudocoelomate animals.

Choose the correct answer from the options given below:

(1) A, C and D only **(2)** B and C only
(3) B, D and E only **(4)** C, D and E only

188. The parts of human brain that help in regulation of sexual behaviour, expression of excitement, pleasure, rage, fear etc. are:

(1) Limbic system and hypothalamus
(2) Corpora quadrigemina and hippocampus
(3) Brain stem and epithalamus
(4) Corpus callosum and thalamus

189. The unique mammalian characteristics are:

(1) hairs, tympanic membrane and mammary glands
(2) hairs, pinna and mammary glands
(3) hairs, pinna and indirect development
(4) pinna, monocondylic skull and mammary glands

190. Which of the following are NOT under the control of thyroid hormone?

A. Maintenance of water and electrolyte balance
B. Regulation of basal metabolic rate
C. Normal rhythm of sleep-wake cycle
D. Development of immune system
E. Support the process of RBCs formation

Choose the correct answer from the options given below:

(1) A and D only **(2)** B and C only
(3) C and D only **(4)** D and E only

191. Select the correct statements.

A. Tetrad formation is seen during Leptotene.
B. During Anaphase, the centromeres split and chromatids separate.
C. Terminalization takes place during Pachytene.
D. Nucleolus, Golgi complex and ER are reformed during Telophase.
E. Crossing over takes place between sister chromatids of homologous chromosome.

Choose the correct answer from the options given below:

(1) A and C only **(2)** B and D only
(3) A, C and E only **(4)** B and E only

192. Match List I with List II.

List I		List II	
A.	Mast cells	**I.**	Ciliated epithelium
B.	Inner surface of bronchiole	**II.**	Areolar connective tissue
C.	Blood	**III.**	Cuboidal epithelium
D.	Tubular parts of nephron	**IV.**	Specialised connective tissue

Choose the correct answer from the options given below:

(1) A-I, B-II, C-IV, D-III **(2)** A-II, B-III, C-I, D-IV
(3) A-II, B-I, C-IV, D-III **(4)** A-III, B-IV, C-II, D-I

193. Which of the following is characteristic feature of cockroach regarding sexual dimorphism?

(1) Dark brown body colour and anal cerci
(2) Presence of anal styles
(3) Presence of sclerites
(4) Presence of anal cerci

194. Which one of the following is the sequence on corresponding coding strand, if the sequence on mRNA formed is as follows: 5′ AUCGAUCGAUCGAUCGAUCGAUCGAUCG 3′?

(1) 5′ UAGCUAGCUAGCUAGCUAGCUAGCUAGC 3′
(2) 3′ UAGCUAGCUAGCUAGCUAGCUAGCUAGC 5′
(3) 5′ ATCGATCGATCGATCGATCGATCGATCG 3′
(4) 3′ ATCGATCGATCGATCGATCGATCGATCG 5′

195. In cockroach, excretion is brought about by

A. Phallic gland
B. Urecose gland
C. Nephrocytes
D. Fat body
E. Collaterial glands

Choose the correct answer from the options given below :

(1) A and E only **(2)** A, B and E only
(3) B, C and D only **(4)** B and D only

196. Given below are two statements:

Statement I : During G_0 phase of cell cycle, the cell is metabolically inactive.

Statement II : The centrosome undergoes duplication during S phase of interphase.

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

(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect.
(3) Statement I is correct but Statement II is incorrect.
(4) Statement I is incorrect but Statement II is correct.

197. Which one of the following is NOT an advantage of inbreeding?

(1) It decreases homozygosity.
(2) It exposes harmful recessive genes but are eliminated by selection.
(3) Elimination of less desirable genes and accumulation of superior genes takes place due to it.
(4) It decreases the productivity of inbred population, after continuous inbreeding.

198. Which of the following statements are correct?

A. An excessive loss of body fluid from the body switches off osmoreceptors.
B. ADH facilitates water reabsorption to prevent diuresis.
C. ANF causes vasodilation.
D. ADH causes increase in blood pressure.
E. ADH is responsible for decrease in GFR.

Choose the correct answer from the options given below:

(1) A and B only **(2)** B, C and D only
(3) A, B and E only **(4)** C, D and E only

199. Which of the following statements are correct regarding skeletal muscle?

A. Muscle bundles are held together by collagenous connective tissue layer called fascicle.
B. Sarcoplasmic reticulum of muscle fibre is a store house of calcium ions.
C. Striated appearance of skeletal muscle fibre is due to distribution pattern of actin and myosin proteins.
D. M line is considered as functional unit of contraction called sarcomere.

Choose the most appropriate answer from the options given below:

(1) A, B and C only **(2)** B and C only
(3) A, C and D only **(4)** C and D only

200. Which of the following statements are correct?

A. Basophils are most abundant cells of the total WBCs
B. Basophils secrete histamine, serotonin and heparin
C. Basophils are involved in inflammatory response
D. Basophils have kidney shaped nucleus
E. Basophils are agranulocytes

Choose the correct answer from the options given below:

(1) D and E only **(2)** C and E only
(3) B and C only **(4)** A and B only

Answer key & explanations

Questions as they appeared in NEET (UG) 2023 conducted by NTA. Answers verified by competitorspoint.com. Explanations by competitorspoint.com. Source: answers printed in a published copy of the Code E1 paper (exam date 07.05.2023), each checked against NCERT by competitorspoint.com; no disagreements were found.

101 – 1	**102** – 3	**103** – 4	**104** – 1	**105** – 3	**106** – 3	**107** – 1	**108** – 4	**109** – 1	**110** – 4
111 – 2	**112** – 1	**113** – 2	**114** – 2	**115** – 2	**116** – 3	**117** – 2	**118** – 1	**119** – 1	**120** – 1
121 – 1	**122** – 1	**123** – 1	**124** – 3	**125** – 2	**126** – 2	**127** – 3	**128** – 2	**129** – 2	**130** – 2
131 – 2	**132** – 3	**133** – 4	**134** – 3	**135** – 1	**136** – 2	**137** – 1	**138** – 3	**139** – 4	**140** – 1
141 – 3	**142** – 1	**143** – 1	**144** – 1	**145** – 2	**146** – 3	**147** – 2	**148** – 3	**149** – 3	**150** – 1
151 – 2	**152** – 1	**153** – 2	**154** – 2	**155** – 2	**156** – 1	**157** – 2	**158** – 4	**159** – 2	**160** – 1
161 – 1	**162** – 2	**163** – 1	**164** – 1	**165** – 3	**166** – 2	**167** – 1	**168** – 2	**169** – 4	**170** – 1
171 – 2	**172** – 4	**173** – 4	**174** – 1	**175** – 4	**176** – 2	**177** – 2	**178** – 3	**179** – 3	**180** – 3
181 – 3	**182** – 1	**183** – 2	**184** – 1	**185** – 4	**186** – 1	**187** – 2	**188** – 1	**189** – 2	**190** – 3
191 – 2	**192** – 3	**193** – 2	**194** – 3	**195** – 3	**196** – 4	**197** – 4	**198** – 2	**199** – 2	**200** – 3

101. **Ans (1)** In mosses the spore germinates directly into the protonema, the first (juvenile) stage of the gametophyte, so R explains A.

102. **Ans (3)** After fertilisation the synergids are haploid (n), the zygote is diploid (2n) and the primary endosperm nucleus is triploid (3n).

103. **Ans (4)** Moving ions against their concentration gradient needs energy (ATP) and carrier pumps; this is active transport.

104. **Ans (1)** Insect-pollinated (entomophilous) flowers are usually large, colourful and fragrant, and rich in nectar.

105. **Ans (3)** Pleiotropy means a single gene affects multiple phenotypic traits, e.g. phenylketonuria.

106. **Ans (3)** In deep-water rice, ethylene promotes rapid elongation of internodes and petioles so the leaves stay above water.

107. **Ans (1)** Habitat loss and fragmentation is the most important of the 'evil quartet' driving species extinction.

108. **Ans (4)** Ethidium bromide-stained DNA fluoresces as bright orange bands under UV light.

109. **Ans (1)** Manganese is needed for the photolysis (splitting) of water in photosystem II.

110. **Ans (4)** China rose, Petunia and lemon have axile placentation (ovules on a central axis in a multilocular ovary).

111. **Ans (2)** Recombination nodules, the sites of crossing over, appear during pachytene.

112. **Ans (1)** The PS II reaction centre is P680, with an absorption maximum at 680 nm.

113. **Ans (2)** Hershey and Chase (1952), working with bacteriophages, gave the unequivocal proof that DNA is the genetic material.

114. **Ans (2)** DNA replication occurs in the S (synthesis) phase of interphase.

115. **Ans (2)** Mature mesophyll cells regaining the ability to divide and forming a callus is dedifferentiation.

116. **Ans (3)** Starch forms helices that trap iodine (blue colour). Cellulose lacks such complex helices, so it cannot hold iodine.

117. **Ans (2)** Gibberellins sprayed on juvenile conifers hasten maturity and lead to early seed production.

118. **Ans (1)** Transpiration pull can lift water over 130 m, and evaporative cooling can lower leaf temperature by 10–15 °C, so both statements are correct.

119. **Ans (1)** Diadelphous stamens with dithecous anthers are typical of Fabaceae and are not found in Solanaceae or Liliaceae.

120. **Ans (1)** ESTs (Expressed Sequence Tags) identify all the genes that are expressed as RNA.

121. **Ans (1)** Detritivores fragment detritus, humus is degraded during mineralisation, and soluble nutrients are leached into the soil. The DFC begins with dead matter, and earthworms only fragment detritus (that is not catabolism).

122. **Ans (1)** Ozone thickness in an air column is measured in Dobson units (DU).

123. **Ans (1)** Cambium is less active in winter, so late (autumn) wood has fewer xylary elements with narrow vessels; R explains A.

124. **Ans (3)** Centromeres split and sister chromatids separate in anaphase II.

125. **Ans (2)** The Earth Summit on Biological Diversity was held in Rio de Janeiro in 1992.

126. **Ans (2)** One glucose needs 6 turns of the Calvin cycle: 18 ATP and 12 NADPH.

127. **Ans (3)** In GPP – R = NPP, R is the respiratory loss of the producers.

128. **Ans (2)** Chilled ethanol precipitates the purified DNA out of the solution.

129. **Ans (2)** In eukaryotes, RNA polymerase III transcribes tRNA, 5S rRNA and snRNAs.

130. **Ans (2)** Tassels of the corn cob are the stigma and style; they wave in the wind to trap pollen grains.

131. **Ans (2)** Selaginella and Salvinia are heterosporous pteridophytes.

132. **Ans (3)** In biolistics (gene gun), DNA-coated microparticles of tungsten or gold are shot into cells.

133. **Ans (4)** Endarch and exarch describe the position of primary (not secondary) xylem, so Statement I is false. Exarch xylem is typical of roots, so Statement II is true.

134. **Ans (3)** Alfred Sturtevant used recombination frequency between gene pairs to map gene positions on chromosomes.

135. **Ans (1)** ATP is used in glycolysis at glucose → glucose-6-phosphate and fructose-6-phosphate → fructose-1,6-bisphosphate; R explains A.

136. **Ans (2)** Algal blooms deteriorate water quality and cause fish mortality, so statement (2) is incorrect.

137. **Ans (1)** A ribosome is made of rRNA and about 80 different proteins.

138. **Ans (3)** Klinefelter's (XXY) individuals are masculine with some feminine development (gynaecomastia) and are sterile. Langdon Down described Down's syndrome, not Klinefelter's.

139. **Ans (4)** Oxidative decarboxylation – pyruvate dehydrogenase; glycolysis – EMP pathway; oxidative phosphorylation – ETS; TCA cycle – citrate synthase.

140. **Ans (1)** A flower is a modified shoot: the apical meristem becomes a floral meristem, and condensed internodes bear the floral appendages laterally. R explains A.

141. **Ans (3)** Gymnosperm pollen is carried by air to the micropyle (mouth) of the ovule, not to the archegonia, so R is false.

142. **Ans (1)** Cohesion – attraction among water molecules; adhesion – attraction to polar surfaces; surface tension – more attraction in the liquid phase; guttation – water loss in the liquid phase.

143. **Ans (1)** Chemiosmosis needs a membrane, a proton pump, a proton gradient and ATP synthase.

144. **Ans (1)** Malonate competitively inhibits succinic dehydrogenase, a key Krebs-cycle enzyme.

145. **Ans (2)** Lenticels allow gas exchange, and bark is the periderm plus secondary phloem. Early-season bark is soft bark, bark includes only tissues outside the vascular cambium, and phellogen is a few layers thick.

146. **Ans (3)** M phase – equational division; G_2 – proteins synthesised; quiescent (G_0) – inactive; G_1 – interval between mitosis and DNA replication.

147. **Ans (2)** Mutualism (+,+); commensalism (+,0); amensalism (–,0); parasitism (+,–).

148. **Ans (3)** Gause's principle is stated correctly. Herbivores and plants, not carnivores, are generally more affected by competition.

149. **Ans (3)** Iron – activator of catalase; zinc – auxin synthesis; boron – cell elongation and differentiation; molybdenum – nitrate reductase.

150. **Ans (1)** Restriction digestion → isolation of the desired fragment → PCR amplification → ligation and insertion into the host gives the order B, C, D, A.

151. **Ans (2)** Vasectomy – surgical; coitus interruptus – natural; cervical caps – barrier; Saheli – oral (non-steroidal pill).

152. **Ans (1)** The vas deferens receives the seminal vesicle duct and opens into the urethra as the ejaculatory duct, and the cervical canal plus the vagina form the birth canal.

153. **Ans (2)** Biomagnification is the increasing concentration of a toxicant at successive trophic levels. Nutrients promote algal blooms, which raise fish mortality.

154. **Ans (2)** A double line between male and female denotes consanguineous mating (mating between relatives).

155. **Ans (2)** Gonorrhoea is bacterial and completely curable if treated early; herpes, hepatitis B and HIV are viral.

156. **Ans (1)** Heroin slows body functions; marijuana affects the cardiovascular system; cocaine blocks dopamine transport; morphine is a painkiller.

157. **Ans (2)** Cartilaginous – between vertebrae; ball and socket – humerus and pectoral girdle; fibrous – flat skull bones; saddle – carpal and metacarpal of the thumb.

158. **Ans (4)** The left end of a protein is the first amino acid (N-terminal) and the right end is the C-terminal, so Statement I is false. Adult Hb is $\alpha_2\beta_2$.

159. **Ans (2)** Mitochondria, chloroplasts and peroxisomes are not part of the endomembrane system (ER, Golgi, lysosomes and vacuoles are).

160. **Ans (1)** RNA is less stable and mutates faster, so RNA viruses with short life spans mutate and evolve quickly.

161. **Ans (1)** CCK – pancreas; GIP – gastric gland; ANF – heart; ADH – kidney.

162. **Ans (2)** An intact endometrium is needed for implantation, and its breakdown after corpus luteum degeneration is true, but this does not explain A.

163. **Ans (1)** Ringworm – Trichophyton; filariasis – Wuchereria; malaria – Plasmodium vivax; pneumonia – Haemophilus influenzae.

164. **Ans (1)** Low temperature inactivates enzymes temporarily, heat denatures them, and a substrate look-alike inhibitor is competitive.

165. **Ans (3)** Taenia – flame cells; Paramoecium – contractile vacuole; Periplaneta – urecose glands; Pheretima – nephridia.

166. **Ans (2)** Conventional serum and urine analysis cannot detect disease early; rDNA technology, PCR and ELISA can.

167. **Ans (1)** Leopard–lion – competition; cuckoo – brood parasitism; mycorrhiza – mutualism; cattle egret – commensalism.

168. **Ans (2)** Ligaments are dense regular tissue and cartilage is specialised connective tissue, so both statements are false.

169. **Ans (4)** In prokaryotes, negatively charged DNA is held with positively charged proteins, so Statement I is false. Nucleosomes in eukaryotes form as described, so Statement II is true.

170. **Ans (1)** Fovea – greatest visual acuity; iris – regulates pupil diameter; blind spot – where the optic nerve leaves; sclera – dense connective tissue outer layer.

171. **Ans (2)** Numbat, spotted cuscus and flying phalanger are Australian marsupials (adaptive radiation); bobcat, mole, lemur and wolf are placentals.

172. **Ans (4)** Non-primates show oestrus cycles, absence of menses may indicate pregnancy, and menstrual cycles run from menarche to menopause. The first cycle is menarche, not menopause.

173. **Ans (4)** Vital capacity = IRV + ERV + TV.

174. **Ans (1)** P – atrial depolarisation; Q – beginning of systole; QRS – ventricular depolarisation; T – ventricular repolarisation.

175. **Ans (4)** Amniocentesis for sex determination is banned and is not an RCH strategy; the ban checks female foeticide.

176. **Ans (2)** The ileo-caecal valve prevents backflow of faecal matter from the caecum.

177. **Ans (2)** In the lac operon: a – transacetylase; y – permease; i – repressor; z – β-galactosidase.

178. **Ans (3)** Peptic (chief) cells – pepsinogen; goblet cells – mucus; oxyntic cells – HCl and intrinsic factor; hepatic cells – bile.

179. **Ans (3)** The cytoskeleton gives mechanical support, motility and maintenance of cell shape.

180. **Ans (3)** Nephrons are cortical or juxtamedullary (A true), but juxtamedullary nephrons have long loops of Henle (R false).

181. **Ans (3)** Electrostatic precipitators in thermal power plants remove particulate matter (over 99%), not ionising radiation.

182. **Ans (1)** A broad palm with a single (simian) crease is characteristic of Down's syndrome (trisomy 21).

183. **Ans (2)** Hemichordates are bilaterally symmetrical; ctenophores, coelenterates and adult echinoderms are radial.

184. **Ans (1)** HIV replicates in helper T (T_H) lymphocytes, and the progeny attack other helper T cells.

185. **Ans (4)** A probe is a labelled nucleic acid used for detection; BAC, YAC and pBR322 are cloning vectors.

186. **Ans (1)** Logistic – limited resources; exponential – unlimited resources; expanding pyramid – pre-reproductive group largest; stable pyramid – pre-reproductive ≈ reproductive.

187. **Ans (2)** Chordates have a closed circulatory system and paired pharyngeal gill slits; their nerve cord is dorsal, hollow and single, the heart is ventral, and they are coelomates.

188. **Ans (1)** The limbic system with the hypothalamus regulates sexual behaviour and emotions such as excitement, pleasure, rage and fear.

189. **Ans (2)** Hair, pinna (external ear) and mammary glands are unique to mammals.

190. **Ans (3)** Thyroid hormones control BMR, water/electrolyte balance and RBC formation, but not the sleep–wake rhythm (melatonin) or immune development (thymosins).

191. **Ans (2)** Chromatids separate at anaphase and organelles re-form at telophase. Tetrads form in zygotene, terminalisation occurs in diakinesis, and crossing over is between non-sister chromatids.

192. **Ans (3)** Mast cells – areolar tissue; bronchiole lining – ciliated epithelium; blood – specialised connective tissue; nephron tubules – cuboidal epithelium.

193. **Ans (2)** Anal styles are present only in male cockroaches; the other features occur in both sexes.

194. **Ans (3)** The coding strand has the same sequence and polarity as mRNA, with T in place of U.

195. **Ans (3)** Excretion in cockroach is by Malpighian tubules, aided by the fat body, nephrocytes and urecose glands.

196. **Ans (4)** G_0 cells are metabolically active but not dividing (I false); the centrosome duplicates in S phase (II true).

197. **Ans (4)** Continuous inbreeding lowers fertility and productivity (inbreeding depression), so this is not an advantage.

198. **Ans (2)** ADH prevents diuresis and raises blood pressure, and ANF is a vasodilator. Fluid loss switches osmoreceptors on, and ADH increases GFR.

199. **Ans (2)** The SR stores Ca^{2+} and striations come from actin–myosin distribution. Bundles (fascicles) are held by fascia, and the sarcomere lies between two Z lines.

200. **Ans (3)** Basophils secrete histamine, serotonin and heparin and take part in inflammation. They are the least abundant granulocytes, with a lobed nucleus.