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NEET (UG) 2021 — Biology (Botany + Zoology)

Exam date: 12 September 2021 • Test Booklet Code: P3 • Questions 101–200 (100 questions; attempt 90) • +4 / –1

Questions as they appeared in NEET (UG) 2021 conducted by NTA. Answers per NTA final key. Explanations by competitorspoint.com.

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

101. Which of the following statements is not correct?

(1) Pyramid of numbers in a grassland ecosystem is upright.
(2) Pyramid of biomass in sea is generally inverted.
(3) Pyramid of biomass in sea is generally upright.
(4) Pyramid of energy is always upright.

102. Which of the following plants is monoecious?

(1) Cycas circinalis **(2)** Carica papaya
(3) Chara **(4)** Marchantia polymorpha

103. The first stable product of CO_2 fixation in Sorghum is

(1) Phosphoglyceric acid **(2)** Pyruvic acid
(3) Oxaloacetic acid **(4)** Succinic acid

104. Diadelphous stamens are found in

(1) China rose and citrus **(2)** China rose
(3) Citrus **(4)** Pea

105. DNA strands on a gel stained with ethidium bromide when viewed under UV radiation, appear as

(1) Bright blue bands **(2)** Yellow bands
(3) Bright orange bands **(4)** Dark red bands

106. Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called

(1) Maturity **(2)** Elasticity
(3) Flexibility **(4)** Plasticity

107. Match List-I with List-II.

List I		List II	
(a)	Protoplast fusion	**(i)**	Totipotency
(b)	Plant tissue culture	**(ii)**	Pomato
(c)	Meristem culture	**(iii)**	Somaclones
(d)	Micropropagation	**(iv)**	Virus free plants

Choose the correct answer from the options given below:

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

108. In the equation GPP – R = NPP R represents :

(1) Respiration losses **(2)** Radiant energy
(3) Retardation factor **(4)** Environmental factor

109. The production of gametes by the parents, formation of zygotes, the F_1 and F_2 plants, can be understood from a diagram called :

(1) Net square **(2)** Bullet square
(3) Punch square **(4)** Punnett square

110. Which of the following is an incorrect statement?

(1) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm
(2) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles
(3) Microbodies are present both in plant and animal cells
(4) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm

111. Match List-I with List-II.

List I		List II	
(a)	Lenticels	**(i)**	Phellogen
(b)	Cork cambium	**(ii)**	Suberin deposition
(c)	Secondary cortex	**(iii)**	Exchange of gases
(d)	Cork	**(iv)**	Phelloderm

Choose the correct answer from the options given below:

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

112. The amount of nutrients, such as carbon, nitrogen, phosphorus and calcium present in the soil at any given time, is referred to as :

(1) Standing crop **(2)** Climax
(3) Climax community **(4)** Standing state

113. The term used for transfer of pollen grains from anthers of one plant to stigma of a different plant which, during pollination, brings genetically different types of pollen grains to stigma, is :

(1) Cleistogamy **(2)** Xenogamy
(3) Geitonogamy **(4)** Chasmogamy

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

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

115. Which of the following is a correct sequence of steps in a PCR (Polymerase Chain Reaction)?

(1) Annealing, Denaturation, Extension
(2) Denaturation, Annealing, Extension
(3) Denaturation, Extension, Annealing
(4) Extension, Denaturation, Annealing

116. When gene targeting involving gene amplification is attempted in an individual's tissue to treat disease, it is known as :

(1) Safety testing **(2)** Biopiracy
(3) Gene therapy **(4)** Molecular diagnosis

117. Match List-I with List-II.

List I		List II	
(a)	Cristae	**(i)**	Primary constriction in chromosome
(b)	Thylakoids	**(ii)**	Disc-shaped sacs in Golgi apparatus
(c)	Centromere	**(iii)**	Infoldings in mitochondria
(d)	Cisternae	**(iv)**	Flattened membranous sacs in stroma of plastids

Choose the correct answer from the options given below:

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

118. The factor that leads to Founder effect in a population is :

(1) Genetic drift **(2)** Natural selection
(3) Genetic recombination **(4)** Mutation

119. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred to as :

(1) Acrocentric **(2)** Metacentric
(3) Telocentric **(4)** Sub-metacentric

120. Gemmae are present in

(1) Some Liverworts **(2)** Mosses
(3) Pteridophytes **(4)** Some Gymnosperms

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

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

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

123. The site of perception of light in plants during photoperiodism is

(1) Leaf **(2)** Shoot apex
(3) Stem **(4)** Axillary bud

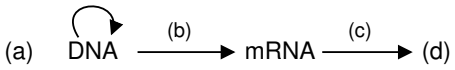
124. The plant hormone used to destroy weeds in a field

(1) IBA **(2)** IAA
(3) NAA **(4)** 2, 4-D

125. Which of the following algae produce Carrageen?

(1) Blue-green algae **(2)** Green algae
(3) Brown algae **(4)** Red algae

126. Complete the flow chart on central dogma.



(1) (a)-Transduction; (b)-Translation; (c)-Replication; (d)-Protein
(2) (a)-Replication; (b)-Transcription; (c)-Transduction; (d)-Protein
(3) (a)-Translation; (b)-Replication; (c)-Transcription;(d)-Transduction
(4) (a)-Replication; (b)-Transcription; (c)-Translation; (d)-Protein

127. Which of the following are not secondary metabolites in plants?

(1) Rubber, gums **(2)** Morphine, codeine
(3) Amino acids, glucose **(4)** Vinblastine, curcumin

128. In spite of interspecific competition in nature, which mechanism the competing species might have evolved for their survival?

(1) Predation **(2)** Resource partitioning
(3) Competitive release **(4)** Mutualism

129. Which of the following is not an application of PCR (Polymerase Chain Reaction)?

(1) Detection of gene mutation
(2) Molecular diagnosis
(3) Gene amplification
(4) Purification of isolated protein

130. Match List-I with List-II.

List I		List II	
(a)	Cells with active cell division capacity	**(i)**	Vascular tissues
(b)	Tissue having all cells similar in structure and function	**(ii)**	Meristematic tissue
(c)	Tissue having different types of cells	**(iii)**	Sclereids
(d)	Dead cells with highly thickened walls and narrow lumen	**(iv)**	Simple tissue

Choose the correct answer from the options given below:

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

131. A typical angiosperm embryo sac at maturity is:

(1) 8-nucleate and 8-celled **(2)** 8-nucleate and 7-celled
(3) 7-nucleate and 8-celled **(4)** 7-nucleate and 7-celled

132. Which of the following algae contains mannitol as reserve food material?

(1) Ulothrix **(2)** Ectocarpus
(3) Gracilaria **(4)** Volvox

133. Genera like Selaginella and Salvinia produce two kinds of spores. Such plants are known as:

(1) Heterosporous **(2)** Homosorus
(3) Heterosorus **(4)** Homosporous

134. Mutations in plant cells can be induced by:

(1) Zeatin **(2)** Kinetin
(3) Infrared rays **(4)** Gamma rays

135. Amensalism can be represented as:

(1) Species A (+); Species B (0)
(2) Species A (–); Species B (0)
(3) Species A (+); Species B (+)
(4) Species A (–); Species B (–)

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

136. What is the role of RNA polymerase III in the process of transcription in eukaryotes?

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

137. Select the correct pair.

(1) Loose parenchyma cells rupturing the epidermis and forming a lens shaped opening in bark – Spongy parenchyma
(2) Large colorless empty cells in the epidermis of grass leaves – Subsidiary cells
(3) In dicot leaves, vascular bundles are surrounded by large thick-walled cells – Conjunctive tissue

(4) Cells of medullary rays that form part of cambial ring – Interfascicular cambium

138. Plasmid pBR322 has PstI restriction enzyme site within gene amp^R that confers ampicillin resistance. If this enzyme is used for inserting a gene for β-galactoside production and the recombinant plasmid is inserted in an E. coli strain

(1) It will be able to produce a novel protein with dual ability
(2) It will not be able to confer ampicillin resistance to the host cell
(3) The transformed cells will have the ability to resist ampicillin as well as produce β-galactoside
(4) It will lead to lysis of host cell

139. DNA fingerprinting involves identifying differences in some specific regions in DNA sequence, called as

(1) Polymorphic DNA **(2)** Satellite DNA
(3) Repetitive DNA **(4)** Single nucleotides

140. In the exponential growth equation $N_t = N_0e^{rt}$, e represents

(1) The base of geometric logarithms
(2) The base of number logarithms
(3) The base of exponential logarithms
(4) The base of natural logarithms

141. Which of the following statements is incorrect?

(1) Cyclic photophosphorylation involves both PS I and PS II
(2) Both ATP and NADPH + H^+ are synthesized during non-cyclic photophosphorylation
(3) Stroma lamellae have PS I only and lack NADP reductase
(4) Grana lamellae have both PS I and PS II

142. Which of the following statements is correct ?

(1) Some of the organisms can fix atmospheric nitrogen in specialized cells called sheath cells
(2) Fusion of two cells is called Karyogamy
(3) Fusion of protoplasms between two motile or non-motile gametes is called plasmogamy
(4) Organisms that depend on living plants are called saprophytes

143. Match Column-I with Column-II.

Column I		Column II	
(a)	Nitrococcus	**(i)**	Denitrification
(b)	Rhizobium	**(ii)**	Conversion of ammonia to nitrite
(c)	Thiobacillus	**(iii)**	Conversion of nitrite to nitrate
(d)	Nitrobacter	**(iv)**	Conversion of atmospheric nitrogen to ammonia

Choose the correct answer from the options given below:

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

144. Which of the following statements is incorrect?

(1) Oxidation-reduction reactions produce proton gradient in respiration
(2) During aerobic respiration, role of oxygen is limited to the terminal stage
(3) In ETC (Electron Transport Chain), one molecule of NADH + H^+ gives rise to 2 ATP molecules, and one $FADH_2$ gives rise to 3 ATP molecules
(4) ATP is synthesized through complex V

145. In some members of which of the following pairs of families, pollen grains retain their viability for months after release?

(1) Rosaceae ; Leguminosae **(2)** Poaceae ; Rosaceae
(3) Poaceae ; Leguminosae **(4)** Poaceae ; Solanaceae

146. Identify the correct statement.

(1) Split gene arrangement is characteristic of prokaryotes
(2) In capping, methyl guanosine triphosphate is added to the 3' end of hnRNA
(3) RNA polymerase binds with Rho factor to terminate the process of transcription in bacteria
(4) The coding strand in a transcription unit is copied to an mRNA

147. Match Column-I with Column-II.

Column I		Column II	
(a)	% ♂ $K_{(5)}\ C_{1+2+(2)}\ A_{(9)+1}\ G_1$	**(i)**	Brassicaceae
(b)	⊕ ♂ $K_{(5)}\ \overline{C_{(5)}\ A_5}\ \underline{G}_{(2)}$	**(ii)**	Liliaceae
(c)	⊕ ♂ $\overline{P_{(3+3)}\ A_{3+3}}\ \underline{G}_{(3)}$	**(iii)**	Fabaceae
(d)	⊕ ♂ $K_{2+2}\ C_4\ A_{2+4}\ \underline{G}_{(2)}$	**(iv)**	Solanaceae

Choose the correct answer from the options given below:

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

148. Match List-I with List-II.

List I		List II	
(a)	Protein	**(i)**	C = C double bonds
(b)	Unsaturated fatty acid	**(ii)**	Phosphodiester bonds
(c)	Nucleic acid	**(iii)**	Glycosidic bonds
(d)	Polysaccharide	**(iv)**	Peptide bonds

Choose the correct answer from the options given below:

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

149. Match List-I with List-II.

List I		List II	
(a)	S 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)**	DNA replication

Choose the correct answer from the options given below:

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

150. Nowadays it is possible to detect the mutated gene causing cancer by allowing radioactive probe to hybridise with its complementary DNA in a clone of cells, followed by its detection using autoradiography because :

(1) mutated gene does not appear on photographic film as the probe has complementarity with it
(2) mutated gene partially appears on a photographic film
(3) mutated gene completely and clearly appears on a photographic film
(4) mutated gene does not appear on a photographic film as the probe has no complementarity with it

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

151. Erythropoietin hormone which stimulates R.B.C. formation is produced by:

(1) Juxtaglomerular cells of the kidney
(2) Alpha cells of pancreas
(3) The cells of rostral adenohypophysis
(4) The cells of bone marrow

152. Which of the following characteristics is incorrect with respect to cockroach?

(1) 10th abdominal segment in both sexes, bears a pair of anal cerci
(2) A ring of gastric caeca is present at the junction of midgut and hind gut
(3) Hypopharynx lies within the cavity enclosed by the mouth parts
(4) In females, 7th-9th sterna together form a genital pouch

153. Succus entericus is referred to as:

(1) Chyme **(2)** Pancreatic juice
(3) Intestinal juice **(4)** Gastric juice

154. Which stage of meiotic prophase shows terminalisation of chiasmata as its distinctive feature?

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

155. The partial pressures (in mm Hg) of oxygen (O_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are:

(1) pO_2 = 159 and pCO_2 = 0.3
(2) pO_2 = 104 and pCO_2 = 40
(3) pO_2 = 40 and pCO_2 = 45
(4) pO_2 = 95 and pCO_2 = 40

156. Match the following:

List I		List II	
(a)	Physalia	**(i)**	Pearl oyster
(b)	Limulus	**(ii)**	Portuguese Man of War
(c)	Ancylostoma	**(iii)**	Living fossil
(d)	Pinctada	**(iv)**	Hookworm

Choose the correct answer from the options given below:

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

157. During the process of gene amplification using PCR, if very high temperature is not maintained in the beginning, then which of the following steps of PCR will be affected first?

(1) Ligation **(2)** Annealing
(3) Extension **(4)** Denaturation

158. Match List-I with List-II.

List I		List II	
(a)	Aspergillus niger	**(i)**	Acetic acid
(b)	Acetobacter aceti	**(ii)**	Lactic acid
(c)	Clostridium butylicum	**(iii)**	Citric acid
(d)	Lactobacillus	**(iv)**	Butyric acid

Choose the correct answer from the options given below:

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

159. Which of the following statements wrongly represents the nature of smooth muscle?

(1) These muscles are present in the wall of blood vessels
(2) These muscles have no striations
(3) They are involuntary muscles
(4) Communication among the cells is performed by intercalated discs

160. Chronic auto immune disorder affecting neuro muscular junction leading to fatigue, weakening and paralysis of skeletal muscle is called as:

(1) Gout **(2)** Arthritis
(3) Muscular dystrophy **(4)** Myasthenia gravis

161. Persons with 'AB' blood group are called as "Universal recipients". This is due to :

(1) Absence of antibodies, anti-A and anti-B, in plasma
(2) Absence of antigens A and B on the surface of RBCs
(3) Absence of antigens A and B in plasma
(4) Presence of antibodies, anti-A and anti-B, on RBCs

162. The fruit fly has 8 chromosomes (2n) in each cell. During interphase of Mitosis if the number of chromosomes at G_1 phase is 8, what would be the number of chromosomes after S phase?

(1) 32 **(2)** 8
(3) 16 **(4)** 4

163. Receptors for sperm binding in mammals are present on :

(1) Zona pellucida **(2)** Corona radiata
(3) Vitelline membrane **(4)** Perivitelline space

164. Which one of the following belongs to the family Muscidae?

(1) House fly **(2)** Fire fly
(3) Grasshopper **(4)** Cockroach

165. Identify the incorrect pair

(1) Drugs – Ricin **(2)** Alkaloids – Codeine
(3) Toxin – Abrin **(4)** Lectins – Concanavalin A

166. Venereal diseases can spread through: (a) Using sterile needles (b) Transfusion of blood from infected person (c) Infected mother to foetus (d) Kissing (e) Inheritance

Choose the correct answer from the options given below:

(1) (a) and (c) only **(2)** (a), (b) and (c) only
(3) (b), (c) and (d) only **(4)** (b) and (c) only

167. The organelles that are included in the endomembrane system are

(1) Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes
(2) Endoplasmic reticulum, Mitochondria, Ribosomes and Lysosomes
(3) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles
(4) Golgi complex, Mitochondria, Ribosomes and Lysosomes

168. For effective treatment of the disease, early diagnosis and understanding its pathophysiology is very important. Which of the following molecular diagnostic techniques is very useful for early detection?

(1) Hybridization Technique **(2)** Western Blotting Technique
(3) Southern Blotting Technique **(4)** ELISA Technique

169. With regard to insulin choose correct options. (a) C-peptide is not present in mature insulin. (b) The insulin produced by rDNA technology has C-peptide. (c) The pro-insulin has C-peptide (d) A-peptide and B-peptide of insulin are interconnected by disulphide bridges.

Choose the correct answer from the options given below

(1) (a) and (d) only **(2)** (b) and (d) only
(3) (b) and (c) only **(4)** (a), (c) and (d) only

170. A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DNA is:

(1) Poly(A) tail sequences
(2) Degenerate primer sequence
(3) Okazaki sequences
(4) Palindromic Nucleotide sequences

171. Which is the "Only enzyme" that has "Capability" to catalyse Initiation, Elongation and Termination in the process of transcription in prokaryotes?

(1) DNase
(2) DNA dependent DNA polymerase
(3) DNA dependent RNA polymerase
(4) DNA Ligase

172. Which one of the following organisms bears hollow and pneumatic long bones?

(1) Ornithorhynchus **(2)** Neophron
(3) Hemidactylus **(4)** Macropus

173. Read the following statements (a) Metagenesis is observed in Helminths. (b) Echinoderms are triploblastic and coelomate animals. (c) Round worms have organ-system level of body organization. (d) Comb plates present in ctenophores help in digestion. (e) Water vascular system is characteristic of Echinoderms.

Choose the correct answer from the options given below.

(1) (b), (c) and (e) are correct
(2) (c), (d) and (e) are correct
(3) (a), (b) and (c) are correct
(4) (a), (d) and (e) are correct

174. Match List-I with List-II.

List I		List II	
(a)	Vaults	**(i)**	Entry of sperm through cervix is blocked
(b)	IUDs	**(ii)**	Removal of vas deferens
(c)	Vasectomy	**(iii)**	Phagocytosis of sperms within the uterus
(d)	Tubectomy	**(iv)**	Removal of fallopian tube

Choose the correct answer from the options given below:

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

175. Sphincter of oddi is present at:

(1) Junction of jejunum and duodenum
(2) Ileo-caecal junction
(3) Junction of hepato-pancreatic duct and duodenum
(4) Gastro-oesophageal junction

176. If Adenine makes 30% of the DNA molecule, what will be the percentage of Thymine, Guanine and Cytosine in it?

(1) T : 20 ; G : 25 ; C : 25 **(2)** T : 20 ; G : 30 ; C : 20
(3) T : 20 ; G : 20 ; C : 30 **(4)** T : 30 ; G : 20 ; C : 20

177. Match List-I with List-II.

List I		List II	
(a)	Metamerism	**(i)**	Coelenterata
(b)	Canal system	**(ii)**	Ctenophora
(c)	Comb plates	**(iii)**	Annelida
(d)	Cnidoblasts	**(iv)**	Porifera

Choose the correct answer from the options given below:

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

178. Which enzyme is responsible for the conversion of inactive fibrinogens to fibrins?

(1) Thrombokinase **(2)** Thrombin
(3) Renin **(4)** Epinephrine

179. Which of the following is not an objective of Biofortification in crops?

(1) Improve micronutrient and mineral content
(2) Improve protein content
(3) Improve resistance to diseases
(4) Improve vitamin content

180. Dobson units are used to measure thickness of:

(1) Troposphere **(2)** CFCs
(3) Stratosphere **(4)** Ozone

181. Which one of the following is an example of Hormone releasing IUD?

(1) Multiload 375 **(2)** CuT
(3) LNG 20 **(4)** Cu 7

182. The centriole undergoes duplication during:

(1) G_2 phase **(2)** S-phase
(3) Prophase **(4)** Metaphase

183. Which of the following RNAs is not required for the synthesis of protein?

(1) siRNA **(2)** mRNA
(3) tRNA **(4)** rRNA

184. In a cross between a male and female, both heterozygous for sickle cell anaemia gene, what percentage of the progeny will be diseased?

(1) 100% **(2)** 50%
(3) 75% **(4)** 25%

185. Select the favourable conditions required for the formation of oxyhaemoglobin at the alveoli.

(1) Low pO_2, low pCO_2, more H^+, higher temperature
(2) High pO_2, low pCO_2, less H^+, lower temperature
(3) Low pO_2, high pCO_2, more H^+, higher temperature
(4) High pO_2, high pCO_2, less H^+, higher temperature

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

186. Match List-I with List-II.

List I		List II	
(a)	Allen's Rule	**(i)**	Kangaroo rat
(b)	Physiological adaptation	**(ii)**	Desert lizard
(c)	Behavioural adaptation	**(iii)**	Marine fish at depth
(d)	Biochemical adaptation	**(iv)**	Polar seal

Choose the correct answer from the options given below:

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

187. Match List-I with List-II.

List I		List II	
(a)	Adaptive radiation	**(i)**	Selection of resistant varieties due to excessive use of herbicides and pesticides
(b)	Convergent evolution	**(ii)**	Bones of forelimbs in Man and Whale
(c)	Divergent evolution	**(iii)**	Wings of Butterfly and Bird
(d)	Evolution by anthropogenic action	**(iv)**	Darwin's Finches

Choose the correct answer from the options given below:

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

188. Which of these is not an important component of initiation of parturition in humans ?

(1) Release of Prolactin
(2) Increase in estrogen and progesterone ratio
(3) Synthesis of prostaglandins
(4) Release of Oxytocin

189. Which one of the following statements about Histones is wrong?

(1) Histones carry positive charge in the side chain
(2) Histones are organized to form a unit of 8 molecules
(3) The pH of histones is slightly acidic
(4) Histones are rich in amino acids - Lysine and Arginine

190. During muscular contraction which of the following events occur? (a) 'H' zone disappears (b) 'A' band widens (c) 'I' band reduces in width (d) Myosin hydrolyzes ATP, releasing the ADP and Pi. (e) Z-lines attached to actins are pulled inwards.

Choose the correct answer from the options given below:

(1) (b), (d), (e), (a) only **(2)** (a), (c), (d), (e) only
(3) (a), (b), (c), (d) only **(4)** (b), (c), (d), (e) only

191. Match List-I with List-II.

List I		List II	
(a)	Scapula	**(i)**	Cartilaginous joints
(b)	Cranium	**(ii)**	Flat bone
(c)	Sternum	**(iii)**	Fibrous joints
(d)	Vertebral column	**(iv)**	Triangular flat bone

Choose the correct answer from the options given below:

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

192. **Assertion (A):** A person goes to high altitude and experiences 'altitude sickness' with symptoms like breathing difficulty and heart palpitations.

Reason (R): Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.

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

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

193. The Adenosine deaminase deficiency results into

(1) Addison's disease
(2) Dysfunction of Immune system
(3) Parkinson's disease
(4) Digestive disorder

194. Which of the following is not a step in Multiple Ovulation Embryo Transfer Technology (MOET)?

(1) Fertilized eggs are transferred to surrogate mothers at 8-32 cell stage
(2) Cow is administered hormone having LH like activity for super ovulation
(3) Cow yields about 6-8 eggs at a time
(4) Cow is fertilized by artificial insemination

195. Match List-I with List-II.

List I		List II	
(a)	Filariasis	**(i)**	Haemophilus influenzae
(b)	Amoebiasis	**(ii)**	Trichophyton
(c)	Pneumonia	**(iii)**	Wuchereria bancrofti
(d)	Ringworm	**(iv)**	Entamoeba histolytica

Choose the correct answer from the options given below:

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

196. Following are the statements with reference to 'lipids'. (a) Lipids having only single bonds are called unsaturated fatty acids (b) Lecithin is a phospholipid. (c) Trihydroxy propane is glycerol. (d) Palmitic acid has 20 carbon atoms including carboxyl carbon. (e) Arachidonic acid has 16 carbon atoms.

Choose the correct answer from the options given below.

(1) (b) and (e) only **(2)** (a) and (b) only
(3) (c) and (d) only **(4)** (b) and (c) only

197. Following are the statements about prostomium of earthworm. (a) It serves as a covering for mouth. (b) It helps to open cracks in the soil into which it can crawl. (c) It is one of the sensory structures. (d) It is the first body segment.

Choose the correct answer from the options given below.

(1) (b) and (c) are correct
(2) (a), (b) and (c) are correct
(3) (a), (b) and (d) are correct
(4) (a), (b), (c) and (d) are correct

198. Which of the following secretes the hormone, relaxin, during the later phase of pregnancy?

(1) Uterus **(2)** Graafian follicle
(3) Corpus luteum **(4)** Foetus

199. **Statement I:** The codon 'AUG' codes for methionine and phenylalanine.

Statement II: 'AAA' and 'AAG' both codons code for the amino acid lysine.

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

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

200. Identify the types of cell junctions that help to stop the leakage of the substances across a tissue and facilitation of communication with neighbouring cells via rapid transfer of ions and molecules.

(1) Adhering junctions and Gap junctions, respectively
(2) Gap junctions and Adhering junctions, respectively
(3) Tight junctions and Gap junctions, respectively
(4) Adhering junctions and Tight junctions, respectively.

Answer key & explanations

Questions as they appeared in NEET (UG) 2021 conducted by NTA. Answers per NTA final key. Explanations by competitorspoint.com. Answer key: NTA NEET (UG) 2021 final answer key, Book P3. No questions were dropped or awarded as bonus for Q101–200.

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

101. **Ans (3)** In the sea, the biomass pyramid is inverted: a small standing crop of fast-multiplying phytoplankton supports a larger biomass of zooplankton.

102. **Ans (3)** Most Chara species carry both oogonia and antheridia on the same thallus (monoecious); Cycas, papaya and Marchantia are dioecious.

103. **Ans (3)** Sorghum is a C_4 plant, so its first stable product is the 4-carbon oxaloacetic acid (OAA).

104. **Ans (4)** Diadelphous means stamens united in two bundles (9+1), as in pea; China rose is monadelphous and Citrus polyadelphous.

105. **Ans (3)** Ethidium bromide-stained DNA shows bright orange bands under UV light.

106. **Ans (4)** The ability to follow different pathways and form different structures in response to environment or life phase is plasticity.

107. **Ans (3)** Protoplast fusion – pomato; tissue culture – totipotency; meristem culture – virus-free plants; micropropagation – somaclones.

108. **Ans (1)** NPP = GPP minus respiration losses (R).

109. **Ans (4)** The Punnett square, devised by R.C. Punnett, shows gametes, zygotes and F_1/F_2 combinations.

110. **Ans (2)** Mature sieve tube elements lack a nucleus; they have peripheral cytoplasm and a large vacuole.

111. **Ans (3)** Lenticels – gas exchange; cork cambium – phellogen; secondary cortex – phelloderm; cork – suberin deposition.

112. **Ans (4)** The amount of nutrients present in the soil at a given time is the standing state.

113. **Ans (2)** Transfer of pollen to the stigma of a different plant, which brings genetically different pollen, is xenogamy.

114. **Ans (4)** Centromeres split and sister chromatids separate at anaphase II.

115. **Ans (2)** Each PCR cycle runs denaturation (about 94 °C), then annealing of primers, then extension by Taq polymerase.

116. **Ans (3)** Correcting a defective gene in a person's cells to treat disease is gene therapy.

117. **Ans (4)** Cristae – mitochondrial infoldings; thylakoids – flattened sacs in plastid stroma; centromere – primary constriction; cisternae – disc-shaped Golgi sacs.

118. **Ans (1)** The founder effect is a form of genetic drift in a small group that starts a new population.

119. **Ans (2)** A centromere in the middle with two equal arms makes a metacentric chromosome.

120. **Ans (1)** Gemmae are asexual buds found in some liverworts such as Marchantia.

121. **Ans (3)** After enzymes remove proteins and RNA, chilled ethanol precipitates the purified DNA.

122. **Ans (2)** Cohesion – mutual attraction of water molecules; adhesion – attraction to polar surfaces; surface tension – greater attraction in the liquid phase; guttation – water loss as liquid.

123. **Ans (1)** Leaves perceive the photoperiod and send the floral stimulus to the apices.

124. **Ans (4)** 2,4-D is a synthetic auxin used as a weedicide against broad-leaved dicot weeds.

125. **Ans (4)** Carrageen is obtained from red algae (Rhodophyceae).

126. **Ans (4)** DNA → DNA is replication, DNA → mRNA is transcription and mRNA → protein is translation.

127. **Ans (3)** Amino acids and glucose are primary metabolites; rubber, gums, alkaloids, vinblastine and curcumin are secondary metabolites.

128. **Ans (2)** Competing species can coexist by resource partitioning, for example MacArthur's warblers feeding in different parts of the same tree.

129. **Ans (4)** PCR amplifies DNA and is used for diagnosis and mutation detection; it plays no role in purifying proteins.

130. **Ans (2)** Active division – meristematic; similar cells – simple tissue; different cell types – vascular (complex) tissue; dead thick-walled cells – sclereids.

131. **Ans (2)** The Polygonum-type embryo sac is 8-nucleate and 7-celled (the central cell has two polar nuclei).

132. **Ans (2)** The brown alga Ectocarpus stores mannitol and laminarin.

133. **Ans (1)** Selaginella and Salvinia produce micro- and megaspores, so they are heterosporous.

134. **Ans (4)** Gamma rays are physical mutagens used in mutation breeding; zeatin and kinetin are cytokinins.

135. **Ans (2)** Amensalism: one species is harmed (–) and the other is unaffected (0).

136. **Ans (3)** RNA polymerase III transcribes tRNA, 5S rRNA and snRNAs.

137. **Ans (4)** Interfascicular cambium arises from medullary ray cells and becomes part of the cambial ring.

138. **Ans (2)** Inserting into the amp^R gene inactivates it, so the recombinant can no longer confer ampicillin resistance.

139. **Ans (3)** DNA fingerprinting is based on repetitive DNA (satellite DNA and VNTRs) that shows high polymorphism.

140. **Ans (4)** In $N_t = N_0e^{rt}$, e is the base of natural logarithms (2.71828).

141. **Ans (1)** Cyclic photophosphorylation involves only PS I.

142. **Ans (3)** Plasmogamy is fusion of the protoplasms of two motile or non-motile gametes; nitrogen is fixed in heterocysts, not sheath cells.

143. **Ans (2)** Nitrococcus – NH_3 to nitrite; Rhizobium – N_2 to NH_3; Thiobacillus – denitrification; Nitrobacter – nitrite to nitrate.

144. **Ans (3)** One NADH gives 3 ATP and one $FADH_2$ gives 2 ATP, so the values in (3) are reversed.

145. **Ans (1)** Pollen of some Rosaceae, Leguminosae and Solanaceae stays viable for months; cereal pollen lasts about 30 minutes.

146. **Ans (3)** In bacteria, transcription is terminated when RNA polymerase associates with the rho factor. Split genes belong to eukaryotes, the cap is added at the 5′ end and the template strand is the one copied.

147. **Ans (2)** Fabaceae has $K_{(5)}\ C_{1+2+(2)}\ A_{(9)+1}$; Solanaceae has epipetalous stamens; Liliaceae has $P_{(3+3)}$; Brassicaceae has $K_{2+2}\ C_4\ A_{2+4}$.

148. **Ans (2)** Proteins have peptide bonds, unsaturated fatty acids C=C bonds, nucleic acids phosphodiester bonds and polysaccharides glycosidic bonds.

149. **Ans (4)** S – DNA replication; G_2 – protein synthesis; quiescent (G_0) – inactive; G_1 – interval between mitosis and DNA replication.

150. **Ans (4)** The probe does not hybridise with the mutated gene, so that gene does not appear on the autoradiogram.

151. **Ans (1)** Juxtaglomerular cells of the kidney secrete erythropoietin.

152. **Ans (2)** A ring of 6–8 gastric caecae lies at the junction of foregut and midgut, not at the midgut–hindgut junction.

153. **Ans (3)** Succus entericus is the intestinal juice secreted by the intestinal glands.

154. **Ans (4)** Terminalisation of chiasmata marks diakinesis.

155. **Ans (2)** Alveolar air has pO_2 of 104 mm Hg and pCO_2 of 40 mm Hg.

156. **Ans (4)** Physalia – Portuguese man of war; Limulus – living fossil; Ancylostoma – hookworm; Pinctada – pearl oyster.

157. **Ans (4)** High temperature is needed first to denature (separate) the DNA strands.

158. **Ans (2)** Aspergillus niger – citric acid; Acetobacter aceti – acetic acid; Clostridium butylicum – butyric acid; Lactobacillus – lactic acid.

159. **Ans (4)** Intercalated discs are found in cardiac muscle; smooth muscle cells communicate through gap junctions.

160. **Ans (4)** Myasthenia gravis is an autoimmune disorder of the neuromuscular junction.

161. **Ans (1)** Group AB plasma has neither anti-A nor anti-B antibodies, so it accepts any ABO blood.

162. **Ans (2)** S phase doubles the DNA, but the chromosome number stays 8 (each chromosome now has two chromatids).

163. **Ans (1)** Sperm-binding receptors are located on the zona pellucida.

164. **Ans (1)** The housefly (Musca) belongs to the family Muscidae.

165. **Ans (1)** Ricin is a toxin, not a drug; abrin is a toxin, codeine an alkaloid and concanavalin A a lectin.

166. **Ans (4)** STDs spread through infected blood and from mother to foetus, not through sterile needles, kissing or inheritance.

167. **Ans (3)** The endomembrane system consists of ER, Golgi complex, lysosomes and vacuoles; mitochondria, chloroplasts and peroxisomes are excluded.

168. **Ans (4)** [source copy prints 3/4; NTA final key gives (4)] ELISA, based on antigen–antibody interaction, is listed in NCERT as an early molecular diagnostic tool (with rDNA technology and PCR).

169. **Ans (4)** Mature insulin lacks the C-peptide, which is present in pro-insulin, and its A and B chains are linked by disulphide bridges. Humulin is made without the C-peptide.

170. **Ans (4)** Restriction endonucleases recognise palindromic nucleotide sequences.

171. **Ans (3)** In prokaryotes, a single DNA-dependent RNA polymerase catalyses initiation, elongation and termination.

172. **Ans (2)** Birds such as Neophron have hollow, pneumatic long bones.

173. **Ans (1)** Echinoderms are triploblastic coelomates with a water vascular system, and roundworms show organ-system level organisation. Metagenesis occurs in cnidarians, and comb plates help in locomotion.

174. **Ans (3)** Vaults block the cervix; IUDs increase phagocytosis of sperms; vasectomy removes part of the vas deferens; tubectomy removes part of the fallopian tube.

175. **Ans (3)** The sphincter of Oddi guards the opening of the hepato-pancreatic duct into the duodenum.

176. **Ans (4)** By Chargaff's rule A = T = 30%, so G = C = 20% each.

177. **Ans (4)** Metamerism – Annelida; canal system – Porifera; comb plates – Ctenophora; cnidoblasts – Coelenterata.

178. **Ans (2)** Thrombin converts fibrinogen into fibrin.

179. **Ans (3)** Biofortification aims at more vitamins, minerals, protein and better fats; disease resistance is a separate breeding goal.

180. **Ans (4)** Dobson units measure the thickness of the ozone layer.

181. **Ans (3)** LNG-20 releases the hormone levonorgestrel; Multiload 375, CuT and Cu7 are copper-releasing IUDs.

182. **Ans (2)** Centrioles duplicate during the S phase.

183. **Ans (1)** siRNA silences genes (RNAi) and is not needed for protein synthesis.

184. **Ans (4)** $Hb^AHb^S \times Hb^AHb^S$ gives 25% Hb^SHb^S (diseased).

185. **Ans (2)** High pO_2, low pCO_2, less H^+ and lower temperature at the alveoli favour oxyhaemoglobin formation.

186. **Ans (4)** Allen's rule – polar seal; physiological – kangaroo rat; behavioural – desert lizard; biochemical – deep-sea fish.

187. **Ans (2)** Adaptive radiation – Darwin's finches; convergent – wings of butterfly and bird; divergent – forelimbs of man and whale; anthropogenic – herbicide and pesticide resistance.

188. **Ans (1)** Parturition is triggered by oxytocin, a rise in the estrogen:progesterone ratio and prostaglandins; prolactin governs lactation.

189. **Ans (3)** Histones are basic proteins rich in lysine and arginine, not acidic.

190. **Ans (2)** During contraction the H zone disappears, the I band shortens, myosin hydrolyses ATP and the Z lines are pulled inwards; the A band keeps its length.

191. **Ans (1)** Scapula – triangular flat bone; cranium – fibrous joints; sternum – flat bone; vertebral column – cartilaginous joints.

192. **Ans (2)** Low pO_2 at high altitude reduces oxygen supply to the body, which causes altitude sickness, so R explains A.

193. **Ans (2)** ADA deficiency causes severe combined immunodeficiency (SCID).

194. **Ans (2)** In MOET, the cow is given hormones with FSH-like activity for superovulation, not LH-like activity.

195. **Ans (3)** Filariasis – Wuchereria; amoebiasis – Entamoeba histolytica; pneumonia – Haemophilus influenzae; ringworm – Trichophyton.

196. **Ans (4)** Lecithin is a phospholipid and trihydroxy propane is glycerol. Single-bonded fatty acids are saturated, palmitic acid has 16 C and arachidonic acid has 20 C.

197. **Ans (2)** The prostomium covers the mouth, wedges open soil cracks and is sensory; the first body segment is the peristomium.

198. **Ans (3)** In the later phase of pregnancy, relaxin is secreted by the ovary (corpus luteum).

199. **Ans (1)** AUG codes only for methionine (the start codon), while AAA and AAG both code for lysine.

200. **Ans (3)** Tight junctions stop leakage of substances across a tissue; gap junctions allow rapid transfer of ions and molecules.