

### Section - A (Biology : Botany)

101. Mutations in plant cells can be induced by :

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

102. 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

Select the **correct** answer from the options given below.

- |     |            |            |            |            |
|-----|------------|------------|------------|------------|
|     | <b>(a)</b> | <b>(b)</b> | <b>(c)</b> | <b>(d)</b> |
| (1) | (ii)       | (iv)       | (i)        | (iii)      |
| (2) | (iv)       | (iii)      | (ii)       | (i)        |
| (3) | (i)        | (ii)       | (iii)      | (iv)       |
| (4) | (iii)      | (ii)       | (iv)       | (i)        |

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

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

104. Match List - I with List - II.

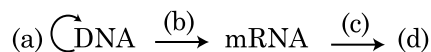
List - I		List - II	
(a)	Lenticels	(i)	Phellogen
(b)	Cork cambium	(ii)	Suberin deposition
(c)	Secondary cortex	(iii)	Exchange of gases
(d)	Cork	(iv)	Phelloderm

Choose the **correct** answer from the options given below.

- |     |            |            |            |            |
|-----|------------|------------|------------|------------|
|     | <b>(a)</b> | <b>(b)</b> | <b>(c)</b> | <b>(d)</b> |
| (1) | (iv)       | (i)        | (iii)      | (ii)       |
| (2) | (iii)      | (i)        | (iv)       | (ii)       |
| (3) | (ii)       | (iii)      | (iv)       | (i)        |
| (4) | (iv)       | (ii)       | (i)        | (iii)      |

## M5

105. Complete the flow chart on central dogma.



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

106. 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) Xenogamy
- (2) Geitonogamy
- (3) Chasmogamy
- (4) Cleistogamy

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

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

108. Which of the following is an **incorrect** statement ?

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

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

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

## 16

110. Gemmae are present in :

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

111. 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.

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

112. 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) Bullet square
- (2) Punch square
- (3) Punnett square
- (4) Net square

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

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

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

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

115. Amensalism can be represented as :

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

116. 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.

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

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

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

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

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

119. In the equation  $GPP - R = NPP$

R represents :

- (1) Radiant energy
- (2) Retardation factor
- (3) Environment factor
- (4) Respiration losses

120. The first stable product of  $CO_2$  fixation in sorghum is :

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

121. Which of the following algae produce Carrageen ?

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

122. Which of the following statements is **not** correct ?

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

123. 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.

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

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

- (1) Morphine, codeine
- (2) Amino acids, glucose
- (3) Vinblastin, curcumin
- (4) Rubber, gums

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

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

126. A typical angiosperm embryo sac at maturity is :

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

127. Diadelphous stamens are found in :
- (1) China rose
  - (2) Citrus
  - (3) Pea
  - (4) China rose and citrus
128. When gene targetting involving gene amplification is attempted in an individual's tissue to treat disease, it is known as :
- (1) Biopiracy
  - (2) Gene therapy
  - (3) Molecular diagnosis
  - (4) Safety testing
129. Which of the following stages of meiosis involves division of centromere ?
- (1) Metaphase I
  - (2) Metaphase II
  - (3) Anaphase II
  - (4) Telophase II
130. Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called :
- (1) Elasticity
  - (2) Flexibility
  - (3) Plasticity
  - (4) Maturity
131. Which of the following plants is monoecious ?
- (1) *Carica papaya*
  - (2) Chara
  - (3) *Marchantia polymorpha*
  - (4) *Cycas circinalis*
132. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as :
- (1) Metacentric
  - (2) Telocentric
  - (3) Sub-metacentric
  - (4) Acrocentric

133. The site of perception of light in plants during photoperiodism is :
- (1) Shoot apex
  - (2) Stem
  - (3) Axillary bud
  - (4) Leaf
134. The factor that leads to Founder effect in a population is :
- (1) Natural selection
  - (2) Genetic recombination
  - (3) Mutation
  - (4) Genetic drift
135. The plant hormone used to destroy weeds in a field is :
- (1) IAA
  - (2) NAA
  - (3) 2, 4-D
  - (4) IBA

### Section - B (Biology : Botany)

136. Match Column - I with Column - II.

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

Choose the **correct** answer from options given below.

- |     | <b>(a)</b> | <b>(b)</b> | <b>(c)</b> | <b>(d)</b> |  |
|-----|------------|------------|------------|------------|--|
| (1) | (ii)       | (iv)       | (i)        | (iii)      |  |
| (2) | (i)        | (ii)       | (iii)      | (iv)       |  |
| (3) | (iii)      | (i)        | (iv)       | (ii)       |  |
| (4) | (iv)       | (iii)      | (ii)       | (i)        |  |
137. Select the **correct** pair.
- (1) Large colorless empty cells in the epidermis of grass leaves - Subsidiary cells
  - (2) In dicot leaves, vascular bundles are surrounded by large thick-walled cells - Conjunctive tissue
  - (3) Cells of medullary rays that form part of cambial ring - Interfascicular cambium
  - (4) Loose parenchyma cells rupturing the epidermis and forming a lens-shaped opening in bark - Spongy parenchyma

138. Which of the following statements is **correct** ?

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

139. Identify the **correct** statement.

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

140. In the exponential growth equation

$$N_t = N_0 e^{rt}, e \text{ represents :}$$

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

141. Which of the following statements is **incorrect** ?

- (1) During aerobic respiration, role of oxygen is limited to the terminal stage.
- (2) In ETC (Electron Transport Chain), one molecule of  $\text{NADH} + \text{H}^+$  gives rise to 2 ATP molecules, and one  $\text{FADH}_2$  gives rise to 3 ATP molecules.
- (3) ATP is synthesized through complex V.
- (4) Oxidation-reduction reactions produce proton gradient in respiration.

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

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

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

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

144. Match List - I with List - II.

List - I		List - II	
(a)	S phase	(i)	Proteins are synthesized
(b)	G <sub>2</sub> phase	(ii)	Inactive phase
(c)	Quiescent stage	(iii)	Interval between mitosis and initiation of DNA replication
(d)	G <sub>1</sub> phase	(iv)	DNA replication

Choose the **correct** answer from the options given below.

- |     |            |            |            |            |
|-----|------------|------------|------------|------------|
|     | <b>(a)</b> | <b>(b)</b> | <b>(c)</b> | <b>(d)</b> |
| (1) | (iii)      | (ii)       | (i)        | (iv)       |
| (2) | (iv)       | (ii)       | (iii)      | (i)        |
| (3) | (iv)       | (i)        | (ii)       | (iii)      |
| (4) | (ii)       | (iv)       | (iii)      | (i)        |

145. Now a days it is possible to detect the mutated gene causing cancer by allowing radioactive probe to hybridise its complimentary DNA in a clone of cells, followed by its detection using autoradiography because :

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

146. 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  $\beta$ -galactoside production and the recombinant plasmid is inserted in an *E.coli* strain

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

147. Match Column - I with Column - II.

Column - I	Column - II
(a) $\% \overset{\uparrow}{\phi} K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$	(i) Brassicaceae
(b) $\oplus \overset{\uparrow}{\phi} K_{(5)} \widehat{C_{(5)} A_5} \underline{G}_2$	(ii) Liliaceae
(c) $\oplus \overset{\uparrow}{\phi} \widehat{P_{(3+3)} A_{3+3}} \underline{G}_{(3)}$	(iii) Fabaceae
(d) $\oplus \overset{\uparrow}{\phi} K_{2+2} C_4 A_{2-4} \underline{G}_{(2)}$	(iv) Solanaceae

Select the **correct** answer from the options given below.

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

148. Which of the following statements is **incorrect** ?

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

149. 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.

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

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

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