

BOTANY

SECTION-A

101. "Girdling Experiment" was performed by Plant Physiologists to identify the plant tissue through which:
- (1) for both water and food transportation
 - (2) osmosis is observed
 - (3) water is transported
 - (4) food is transported

Answer (4)

102. What is the net gain of ATP when each molecule of glucose is converted to two molecules of pyruvic acid?
- (1) Two
 - (2) Eight
 - (3) Four
 - (4) Six

Answer (1)

103. What amount of energy is released from glucose during lactic acid fermentation?
- (1) About 10%
 - (2) Less than 7%
 - (3) Approximately 15%
 - (4) More than 18%

Answer (2)

104. XO type of sex determination can be found in :
- (1) Grasshoppers
 - (2) Monkeys
 - (3) *Drosophila*
 - (4) Birds

Answer (1)

105. Which of the following is **incorrectly** matched?
- (1) *Porphyra* – Floridian Starch
 - (2) *Volvox* – Starch
 - (3) *Ectocarpus* – Fucoxanthin
 - (4) *Ulothrix* – Mannitol

Answer (4)

106. Identify the **incorrect** statement related to Pollination :
- (1) Flowers produce foul odours to attract flies and beetles to get pollinated
 - (2) Moths and butterflies are the most dominant pollinating agents among insects
 - (3) Pollination by water is quite rare in flowering plants
 - (4) Pollination by wind is more common amongst abiotic pollination

Answer (2)

107. Given below are two statements :

Statement I :

Mendel studied seven pairs of contrasting traits in pea plants and proposed the Laws of Inheritance.

Statement II :

Seven characters examined by Mendel in his experiment on pea plants were seed shape and colour, flower colour, pod shape and colour, flower position and stem height.

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

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

Answer (3)

108. Which one of the following plants does **not** show plasticity?

- (1) Buttercup (2) Maize
(3) Cotton (4) Coriander

Answer (2)

109. Exoskeleton of arthropods is composed of :

- (1) Chitin (2) Glucosamine
(3) Cutin (4) Cellulose

Answer (1)

110. Given below are two statements:

Statement I: Decomposition is a process in which the detritus is degraded into simpler substances by microbes.

Statement II: Decomposition is faster if the detritus is rich in lignin and chitin.

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

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

Answer (1)

111. Habitat loss and fragmentation, over exploitation, alien species invasion and co-extinction are causes for:

- (1) Biodiversity loss (2) Natality
(3) Population explosion (4) Competition

Answer (1)

112. Which one of the following is **not** true regarding the release of energy during ATP synthesis through chemiosmosis? It involves:

- (1) Movement of protons across the membrane to the stroma
(2) Reduction of NADP to NADPH₂ on the stroma side of the membrane
(3) Breakdown of proton gradient
(4) Breakdown of electron gradient

Answer (4)

113. Which one of the following produces nitrogen fixing nodules on the roots of *Alnus*?

- (1) *Rhodospirillum* (2) *Beijerinckia*
(3) *Rhizobium* (4) *Frankia*

Answer (4)

114. Identify the **correct** set of statements :

- (a) The leaflets are modified into pointed hard thorns in *Citrus* and *Bougainvillea*
(b) Axillary buds form slender and spirally coiled tendrils in cucumber and pumpkin
(c) Stem is flattened and fleshy in *Opuntia* and modified to perform the function of leaves
(d) *Rhizophora* shows vertically upward growing roots that help to get oxygen for respiration
(e) Subaerially growing stems in grasses and strawberry help in vegetative propagation

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

- (1) (b), (c), (d) and (e) Only (2) (a), (b), (d) and (e) Only
(3) (b) and (c) Only (4) (a) and (d) Only

Answer (1)

115. Which one of the following statement is **not true** regarding gel electrophoresis technique?
- (1) The presence of chromogenic substrate gives blue coloured DNA bands on the gel.
 - (2) Bright orange coloured bands of DNA can be observed in the gel when exposed to UV light.
 - (3) The process of extraction of separated DNA strands from gel is called elution.
 - (4) The separated DNA fragments are stained by using ethidium bromide.

Answer (1)

116. Which one of the following never occurs during mitotic cell division?
- (1) Pairing of homologous chromosomes
 - (2) Coiling and condensation of the chromatids
 - (3) Spindle fibres attach to kinetochores of chromosomes
 - (4) Movement of centrioles towards opposite poles

Answer (1)

117. Which of the following is **not** a method of *ex situ* conservation?
- | | |
|-----------------------------------|----------------------|
| (1) Micropropagation | (2) Cryopreservation |
| (3) <i>In vitro</i> fertilization | (4) National Parks |

Answer (4)

118. The gaseous plant growth regulator is used in plants to :
- (1) help overcome apical dominance
 - (2) kill dicotyledonous weeds in the fields
 - (3) speed up the malting process
 - (4) promote root growth and root hair formation to increase the absorption surface

Answer (4)

119. The appearance of recombination nodules on homologous chromosomes during meiosis characterizes :
- | | |
|---|---------------------|
| (1) Sites at which crossing over occurs | (2) Terminalization |
| (3) Synaptonemal complex | (4) Bivalent |

Answer (1)

120. Production of Cucumber has increased manifold in recent years. Application of which of the following phytohormones has resulted in this increased yield as the hormone is known to produce female flowers in the plants :
- | | |
|--------------|-----------------|
| (1) Ethylene | (2) Cytokinin |
| (3) ABA | (4) Gibberellin |

Answer (1)

121. Given below are two statements :

Statement I :

Cleistogamous flowers are invariably autogamous

Statement II :

Cleistogamy is disadvantageous as there is no chance for cross pollination

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

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

Answer (3)

122. Read the following statements about the vascular bundles :
- (a) In roots, xylem and phloem in a vascular bundle are arranged in an alternate manner along the different radii.
 - (b) Conjoint closed vascular bundles do not possess cambium
 - (c) In open vascular bundles, cambium is present in between xylem and phloem
 - (d) The vascular bundles of dicotyledonous stem possess endarch protoxylem
 - (e) In monocotyledonous root, usually there are more than six xylem bundles present

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

- (1) (a), (b), (c) and (d) Only
- (2) (a), (c), (d) and (e) Only
- (3) (a), (b) and (d) Only
- (4) (b), (c), (d) and (e) Only

Answer (NA) No option is correct

123. In old trees the greater part of secondary xylem is dark brown and resistant to insect attack due to :
- (a) secretion of secondary metabolites and their deposition in the lumen of vessels.
 - (b) deposition of organic compounds like tannins and resins in the central layers of stem.
 - (c) deposition of suberin and aromatic substances in the outer layer of stem.
 - (d) deposition of tannins, gum, resin and aromatic substances in the peripheral layers of stem.
 - (e) presence of parenchyma cells, functionally active xylem elements and essential oils.

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

- (1) (d) and (e) Only
- (2) (b) and (d) Only
- (3) (a) and (b) Only
- (4) (c) and (d) Only

Answer (3)

124. Hydrocolloid carrageen is obtained from:

- (1) Rhodophyceae only
- (2) Phaeophyceae only
- (3) Chlorophyceae and Phaeophyceae
- (4) Phaeophyceae and Rhodophyceae

Answer (1)

125. Which one of the following statements cannot be connected to Predation?

- (1) Both the interacting species are negatively impacted
- (2) It is necessitated by nature to maintain the ecological balance
- (3) It helps in maintaining species diversity in a community
- (4) It might lead to extinction of a species

Answer (1)

126. DNA polymorphism forms the basis of :

- (1) Both genetic mapping and DNA finger printing
- (2) Translation
- (3) Genetic mapping
- (4) DNA finger printing

Answer (1)

127. The flowers are Zygomorphic in:

- (a) Mustard
- (b) Gulmohar
- (c) *Cassia*
- (d) *Datura*
- (e) Chilly

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

- (1) (d), (e) Only
- (2) (c), (d), (e) Only
- (3) (a), (b), (c) Only
- (4) (b), (c) Only

Answer (4)

128. The process of translation of mRNA to proteins begins as soon as :
- (1) Both the subunits join together to bind with mRNA
 - (2) The tRNA is activated and the larger subunit of ribosome encounters mRNA
 - (3) The small subunit of ribosome encounters mRNA
 - (4) The larger subunit of ribosome encounters mRNA

Answer (3)

129. Which of the following is **not** observed during apoplastic pathway ?
- (1) The movement is aided by cytoplasmic streaming
 - (2) Apoplast is continuous and does not provide any barrier to water movement
 - (3) Movement of water occurs through intercellular spaces and wall of the cells
 - (4) The movement does not involve crossing of cell membrane

Answer (1)

130. Given below are two statements :

Statement I :

The primary CO₂ acceptor in C₄ plants is phosphoenolpyruvate and is found in the mesophyll cells.

Statement II :

Mesophyll cells of C₄ plants lack RuBisCo enzyme. In the light of the above statements, choose the **correct** answer from the options given below:

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

Answer (3)

131. Read the following statements and choose the set of **correct** statements :

- (a) Euchromatin is loosely packed chromatin
- (b) Heterochromatin is transcriptionally active
- (c) Histone octamer is wrapped by negatively charged DNA in nucleosome
- (d) Histones are rich in lysine and arginine
- (e) A typical nucleosome contains 400 bp of DNA helix

Choose the correct answer from the options given below :

- (1) (b), (e) Only
- (2) (a), (c), (e) Only
- (3) (b), (d), (e) Only
- (4) (a), (c), (d) Only

Answer (4)

132. Match **List-I** with **List-II**

	List-I		List-II
(a)	Manganese	(i)	Activates the enzyme catalase
(b)	Magnesium	(ii)	Required for pollen germination
(c)	Boron	(iii)	Activates enzymes of respiration
(d)	Iron	(iv)	Functions in splitting of water during photosynthesis

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

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

Answer (4)

133. The device which can remove particulate matter present in the exhaust from a thermal power plant is :
- (1) Electrostatic Precipitator (2) Catalytic Converter
(3) STP (4) Incinerator

Answer (1)

134. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) :

Polymerase chain reaction is used in DNA amplification.

Reason (R) :

The ampicillin resistant gene is used as a selectable marker to check transformation

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

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

Answer (4)

135. Which one of the following plants shows vexillary aestivation and diadelphous stamens?

- (1) *Allium cepa* (2) *Solanum nigrum*
(3) *Colchicum autumnale* (4) *Pisum sativum*

Answer (4)

SECTION-B

136. In the following palindromic base sequences of DNA, which one can be cut easily by particular restriction enzyme?

- (1) 5'CTCAGT3'; 3'GAGTCA5' (2) 5'GTATTC3'; 3'CATAAG5'
(3) 5'GATACT3'; 3'CTATGA5' (4) 5'GAATTC3'; 3'CTTAAG5'

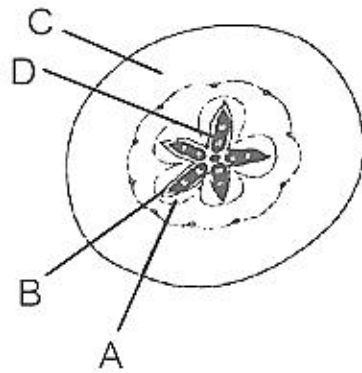
Answer (4)

137. The entire fleet of buses in Delhi were converted to CNG from diesel. In reference to this, which one of the following statements is false?

- (1) It is cheaper than diesel
(2) It cannot be adulterated like diesel
(3) CNG burns more efficiently than diesel
(4) The same diesel engine is used in CNG buses making the cost of conversion low

Answer (4)

138. Which part of the fruit, labelled in the given figure makes it a false fruit?



- (1) C → Thalamus (2) D → Seed
(3) A → Mesocarp (4) B → Endocarp

Answer (1)

139. Addition of more solutes in a given solution will :
- (1) make its water potential zero (2) not affect the water potential at all
 (3) raise its water potential (4) lower its water potential

Answer (4)

140. Match the plant with the kind of life cycle it exhibits:

	List-I		List-II
(a)	<i>Spirogyra</i>	(i)	Dominant diploid sporophyte vascular plant, with highly reduced male or female gametophyte
(b)	Fern	(ii)	Dominant haploid free-living gametophyte
(c)	<i>Funaria</i>	(iii)	Dominant diploid sporophyte alternating with reduced gametophyte called prothallus
(d)	<i>Cycas</i>	(iv)	Dominant haploid leafy gametophyte alternating with partially dependent multicellular sporophyte

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

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

Answer (4)

141. While explaining interspecific interaction of population, (+) sign is assigned for beneficial interaction, (–) sign is assigned for detrimental interaction and (0) for neutral interaction. Which of the following interactions can be assigned (+) for one species and (–) for another species involved in the interaction ?

- (1) Commensalism (2) Competition
 (3) Predation (4) Amensalism

Answer (3)

142. The anatomy of springwood shows some peculiar features. Identify the **correct** set of statements about springwood.

- (a) It is also called as the earlywood
 (b) In spring season cambium produces xylem elements with narrow vessels
 (c) It is lighter in colour
 (d) The springwood along with autumnwood shows alternate concentric rings forming annual rings
 (e) It has lower density

Choose the correct answer from the options given below :

- (1) (a), (b) and (d) Only (2) (c), (d) and (e) Only
 (3) (a), (b), (d) and (e) Only (4) (a), (c), (d) and (e) Only

Answer (4)

143. Read the following statements on lipids and find out correct set of statements:

- (a) Lecithin found in the plasma membrane is a glycolipid
 (b) Saturated fatty acids possess one or more C = C bonds
 (c) Gingly oil has lower melting point, hence remains as oil in winter
 (d) Lipids are generally insoluble in water but soluble in some organic solvents
 (e) When fatty acid is esterified with glycerol, monoglycerides are formed

Choose the correct answer from the option given below:

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

Answer (1)

144. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : Mendel's law of Independent assortment does not hold good for the genes that are located closely on the same chromosome.

Reason (R) : Closely located genes assort independently.

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

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

Answer (1)

145. If a geneticist uses the blind approach for sequencing the whole genome of an organism, followed by assignment of function to different segments, the methodology adopted by him is called as :

- (1) Expressed sequence tags
- (2) Bioinformatics
- (3) Sequence annotation
- (4) Gene mapping

Answer (3)

146. Which one of the following will accelerate phosphorus cycle?

- (1) Weathering of rocks
- (2) Rain fall and storms
- (3) Burning of fossil fuels
- (4) Volcanic activity

Answer (1)

147. Transposons can be used during which one of the following ?

- (1) Autoradiography
- (2) Gene sequencing
- (3) Polymerase Chain Reaction
- (4) Gene Silencing

Answer (4)

148. What is the role of large bundle sheath cells found around the vascular bundles in C₄ plants?

- (1) To enable the plant to tolerate high temperature
- (2) To protect the vascular tissue from high light intensity
- (3) To provide the site for photorespiratory pathway
- (4) To increase the number of chloroplast for the operation of Calvin cycle

Answer (4)

149. Which of the following occurs due to the presence of autosome linked dominant trait ?

- (1) Haemophilia
- (2) Thalassemia
- (3) Sickle cell anaemia
- (4) Myotonic dystrophy

Answer (4)

150. Match List-I with List-II.

	List-I		List-II
(a)	Metacentric chromosome	(i)	Centromere situated close to the end forming one extremely short and one very long arms
(b)	Acrocentric chromosome	(ii)	Centromere at the terminal end
(c)	Submetacentric	(iii)	Centromere in the middle forming two equal arms of chromosomes
(d)	Telocentric chromosome	(iv)	Centromere slightly away from the middle forming one shorter arm and one longer arm

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

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

Answer (3)