BOTANY

SECTION-A

101. Which one of the following statement is **not true** regarding gel electrophoresis technique?

(1) Bright orange coloured bands of DNA can be observed in the gel when exposed to UV light.

(2) The process of extraction of separated DNA strands from gel is called elution.

(3) The separated DNA fragments are stained by using ethidium bromide.

(4) The presence of chromogenic substrate gives blue coloured DNA bands on the gel.

Answer (4)

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

(1) *Beijerinckia*

(2) *Rhizobium*

(3) *Frankia*

(4) *Rhodospirillum*

Answer (3)

103. 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 incorrect but **Statement II** is correct

(2) Both **Statement I** and **Statement II** are correct

(3) Both **Statement I** and **Statement II** are incorrect

(4) **Statement I** is correct but **Statement II** is incorrect

Answer (2)

104. Which of the following is **not** a method of *ex situ* conservation?

(1) Cryopreservation

(2) *In vitro* fertilization

(3) National Parks

(4) Micropropagation

Answer (3)

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

(1) It is necessitated by nature to maintain the ecological balance

(2) It helps in maintaining species diversity in a community

(3) It might lead to extinction of a species

(4) Both the interacting species are negatively impacted

Answer (4)

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

Answer (3)

107. The gaseous plant growth regulator is used in plants to :

(1) kill dicotyledonous weeds in the fields
(2) speed up the malting process
(3) promote root growth and roothair formation to increase the absorption surface
(4) help overcome apical dominance

Answer (3)

108. The appearance of recombination nodules on homologous chromosomes during meiosis characterizes :

(1) Terminalization
(2) Synaptonemal complex
(3) Bivalent
(4) Sites at which crossing over occurs

Answer (4)

109. In old trees the greater part of secondary xylem is dark brown and resistant to insect attack due to :

(a) secretion of secondary metabolities 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) (b) and (d) Only
(2) (a) and (b) Only
(3) (c) and (d) Only
(4) (d) and (e) Only

Answer (2)

110. 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) (a), (b), (d) and (e) Only
(2) (b) and (c) Only
(3) (a) and (d) Only
(4) (b), (c), (d) and (e) Only

Answer (4)

111. XO type of sex determination can be found in :

(1) Monkeys
(2) *Drosophila*
(3) Birds
(4) Grasshoppers

Answer (4)

112. 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), (c), (d) and (e) Only
(2) (a), (b) and (d) Only
(3) (b), (c), (d) and (e) Only
(4) (a), (b), (c) and (d) Only

Answer (NA) No option is correct

113. The process of translation of mRNA to proteins begins as soon as :

(1) The tRNA is activated and the larger subunit of ribosome encounters mRNA
(2) The small subunit of ribosome encounters mRNA
(3) The larger subunit of ribosome encounters mRNA
(4) Both the subunits join together to bind with mRNA

Answer (2)

114. The device which can remove particulate matter present in the exhaust from a thermal power plant is :

(1) Catalytic Convertor
(2) STP
(3) Incinerator
(4) Electrostatic Precipitator

Answer (4)

115. 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) (c), (d), (e) Only
(2) (a), (b), (c) Only
(3) (b), (c) Only
(4) (d), (e) Only

Answer (3)

116. Identify the **incorrect** statement related to Pollination :

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

Answer (1)

117. Which of the following is **not** observed during apoplastic pathway ?

(1) Apoplast is continuous and does not provide any barrier to water movement

(2) Movement of water occurs through intercellular spaces and wall of the cells

(3) The movement does not involve crossing of cell membrane

(4) The movement is aided by cytoplasmic streaming

Answer (4)

118. What is the net gain of ATP when each molecule of glucose is converted to two molecules of pyruvic acid?

(1) Eight

(2) Four

(3) Six

(4) Two

Answer (4)

119. "Girdling Experiment" was performed by Plant Physiologists to identify the plant tissue through which:

(1) osmosis is observed

(2) water is transported

(3) food is transported

(4) for both water and food transportation

Answer (3)

120. 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 incorrect but **Statement II** is correct

(2) Both **Statement I** and **Statement II** are correct

(3) Both **Statement I** and **Statement II** are incorrect

(4) **Statement I** is correct but **Statement II** is incorrect

Answer (4)

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

(1) *Solanum nigrum*

(2) *Colchicum autumnale*

(3) *Pisum sativum*

(4) *Allium cepa*

Answer (3)

122. 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 incorrect but **Statement II** is correct

(2) Both **Statement I** and **Statement II** are correct

(3) Both **Statement I** and **Statement II** are incorrect

(4) **Statement I** is correct but **Statement II** is incorrect

Answer (2)

123. Exoskeleton of arthropods is composed of :

(1) Glucosamine (2) Cutin

(3) Cellulose (4) Chitin

Answer (4)

124. 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 not correct but **(R)** is correct

(2) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

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

(4) **(A)** is correct but **(R)** is not correct

Answer (3)

125. Which of the following is **incorrectly** matched?

(1) *Volvox* – Starch (2) *Ectocarpus* – Fucoxanthin

(3) *Ulothrix* – Mannitol (4) *Porphyra* – Floridian Starch

Answer (3)

126. 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) Cytokinin (2) ABA

(3) Gibberellin (4) Ethylene

Answer (4)

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

(1) Reduction of NADP to $NADPH_2$ on the stroma side of the membrane

(2) Breakdown of proton gradient

(3) Breakdown of electron gradient

(4) Movement of protons across the membrane to the stroma

Answer (3)

128. DNA polymorphism forms the basis of :

(1) Translation

(2) Genetic mapping

(3) DNA finger printing

(4) Both genetic mapping and DNA finger printing

Answer (4)

129. Given below are two statements :

Statement I :

The primary CO_2 acceptor in C_4 plants is phosphoenolpyruvate and is found in the mesophyll cells.

Statement II :

Mesophyll cells of C_4 plants lack RuBisCo enzyme.

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 correct

(2) Both **Statement I** and **Statement II** are correct

(3) Both **Statement I** and **Statement II** are incorrect

(4) **Statement I** is correct but **Statement II** is incorrect

Answer (2)

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

(1) Natality (2) Population explosion

(3) Competition (4) Biodiversity loss

Answer (4)

131. What amount of energy is released from glucose during lactic acid fermentation?

(1) Less than 7% (2) Approximately 15%

(3) More than 18% (4) About 10%

Answer (1)

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

(a) Euchromatin is loosely packed chromatin

(b) Heterochromatin is transcriptionally active

(c) Histone octomer 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) (a), (c), (e) Only (2) (b), (d), (e) Only

(3) (a), (c), (d) Only (4) (b), (e) Only

Answer (3)

133. Which one of the following never occurs during mitotic cell division?

(1) Coiling and condensation of the chromatids

(2) Spindle fibres attach to kinetochores of chromosomes

(3) Movement of centrioles towards opposite poles

(4) Pairing of homologous chromosomes

Answer (4)

134. Hydrocolloid carrageen is obtained from:

(1) Phaeophyceae only (2) Chlorophyceae and Phaeophyceae

(3) Phaeophyceae and Rhodophyceae (4) Rhodophyceae only

Answer (4)

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

(1) Maize (2) Cotton

(3) Coriander (4) Buttercup

Answer (1)

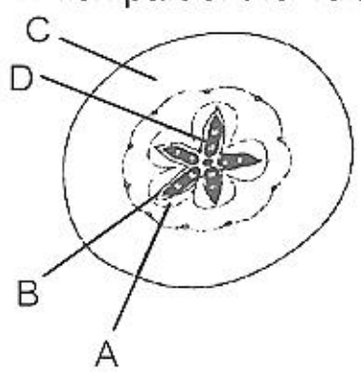
SECTION-B

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

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

Answer (4)

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



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

Answer (4)

138. What is the role of large bundle sheath cells found around the vascular bundles in C_4 plants?

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

Answer (3)

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

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

Answer (3)

140. 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) Gingely 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) (a), (b) and (d) only
(2) (a), (b) and (c) only
(3) (a), (d) and (e) only
(4) (c), (d) and (e) only

Answer (4)

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

Answer (4)

142. 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 cannot be adulterated like diesel

(2) CNG burns more efficiently than diesel

(3) The same diesel engine is used in CNG buses making the cost of conversion low

(4) It is cheaper than diesel

Answer (3)

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

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

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

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

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

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

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

Answer (3)

144. 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)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

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

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

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

Answer (2)

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

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

Answer (3)

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

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

Answer (3)

147. 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 specifies and (–) for another specifies involved in the interaction ?

(1) Competition
(2) Predation
(3) Amensalim
(4) Commensalism

Answer (2)

148. Addition of more solutes in a given solution will :

(1) not affect the water potential at all
(2) raise its water potential
(3) lower its water potential
(4) make its water potential zero

Answer (3)

149. 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) Bioinformatics
(2) Sequence annotation
(3) Gene mapping
(4) Expressed sequence tags

Answer (2)

150. 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) (c), (d) and (e) Only
(2) (a), (b), (d) and (e) Only
(3) (a), (c), (d) and (e) Only
(4) (a), (b) and (d) Only

Answer (3)