



Regd. Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

Answer & Solutions

for

NEET 2022 (Re-Exam)

BOTANY

Section-A (Q. No. 101 to 135)

101. Given below are two statements :

Statement I :

Sickle cell anaemia and Haemophilia are autosomal dominant traits.

Statement II:

Sickle cell anaemia and Haemophilia are disorders of the blood.

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

- (1) Statement 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

Sol. Answer (1)

Sickle cell anaemia is an autosomal recessive trait whereas haemophilia is an X-linked recessive trait. Both the diseases are related to blood.

102. Which stage of meiosis can last for months or years in the oocytes of some vertebrates?

- (1) Diakinesis
- (2) Leptotene
- (3) Pachytene
- (4) Diplotene

Sol. Answer (4)

In oocytes of some vertebrates, diplotene lasts for months or years. It is called dictyotene state i.e., suspended diplotene stage.

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

Assertion (A) :

When a particular restriction enzyme cuts strand of DNA, overhanging stretches or sticky ends are formed.

Reason (R):

Some restriction enzymes cut the strand of DNA a little away from the centre of the palindromic site.

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

Sol. Answer (2)

Both the statements are correct and Reason is the correct explanation of Assertion.

Sticky ends are produced by those restriction enzymes which cut the DNA strand a little away from the centre of the palindromic site, but between the same two bases of the opposite strand.

104. Give the correct descending order of organisms with reference to their estimated number found in Amazon forest.

- (a) Plants (b) Invertebrates

(c) Fishes (d) Mammals

(e) Birds

Choose the correct answer from the options given below

(1) (b) > (a) > (c) > (e) > (d)

(2) (a) > (b) > (e) > (d) > (c)

(3) (a) > (c) > (d) > (b) > (e)

(4) (b) > (a) > (e) > (d) > (c)

Sol. Answer (1)

Insects count-2.5 million species

Plants species-50,000

Fishes- 3000

Birds – 1300

Mammals -430

105. In lac operon, z gene codes for :

(1) Transacetylase (2) β -galactosidase

(3) Permease (4) Repressor

Sol. Answer (2)

z-gene codes for Beta galactosidase enzyme, y-gene code for permease enzyme and a gene code for transacetylase.

106. The 5-C compound formed during TCA cycle is:

(1) Fumaric acid

(2) α -ketoglutaric acid

(3) Oxalo succinic acid

(4) Succinic acid

Sol. Answer (2)

α -ketoglutaric acid is 5 carbon containing compound, fumaric acid is 4 carbon,

Oxalosuccinic acid is 6 carbon and

Succinic acid is 4 carbon.

107. In meiosis, crossing over and exchange of material between homologous chromosomes catalyzed by the enzyme:

(1) Polymerase

(2) Phosphorylase

(3) Recombinase

(4) Transferase

Sol. Answer (3)

The enzyme required during the process of crossing over and exchange of genetic material is recombinase enzyme.

108. All successions irrespective of the habitat proceed to which type of climax community?

(1) Edaphic

(2) Xeric

(3) Mesic

(4) Hydrophytic

Sol. Answer (3)

All successions irrespective of the habitat proceed to mesic type of climax community.

109. When a carrier protein facilitates the movement of two molecules across the membrane in same direction, it is called :

(1) Symport

(2) Uniport

(3) Transport

(4) Antiport

Sol. Answer (1)

Symport is the type of transportation where the two molecules move simultaneously in the same direction using carrier protein.

110. When one CO₂ molecule is fixed as one molecule of triose phosphate, which of the following photochemically made, high energy chemical intermediates are used in the reduction phase?

(1) 2 ATP + 2 NADPH

(2) 1 ATP + 1 NADPH

(3) 1 ATP + 2 NADPH

(4) 2 ATP + 1 NADPH

Sol. Answer (1)

2 ATPs and 2 NADPH are used to fix one molecule of CO₂ into one molecule of triose phosphate.

111. The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called :

(1) Differentiation

(2) Redifferentiation

(3) Development

(4) Plasticity

Sol. Answer (4)

Plasticity – it is the ability of the plants to follow different pathways in response to the environment leading to formation of different kinds of structures.

112. Match List-I with List-II :

List-I	List-II
(a) <i>Chlamydomonas</i>	(i) Moss
(b) <i>Cycas</i>	(ii) Pteridophyte
(c) <i>Selaginella</i>	(iii) Alga
(d) <i>Sphagnum</i>	(iv) Gymnosperm

Choose the correct answer from the options given below .

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

Sol. Answer (3)

Chlamydomonas is an unicellular alga.

Cycas belongs to gymnosperms.

Selaginella is a pteridophyte.

Sphagnum is a moss.

113. Interfascicular cambium is present between

- (1) Secondary xylem and secondary phloem
 (2) Primary xylem and primary phloem
 (3) Pericycle and endodermis Two vascular bundles
 (4) Two vascular bundles

Sol. Answer (4)

Interfascicular cambium is present between the two vascular bundles.

114. Which of the following growth regulators is an adenine derivative ?

- (1) Absciscic acid (2) Auxin
 (3) Cytokinin (4) Ethylene

Sol. Answer (3)

Cytokinin is an adenine derivative.

Auxin is derived from tryptophan amino acid.

Absciscic acid is derived from violaxanthin.

Ethylene is a gaseous hormone derived from methionine.

115. The chromosomal theory of inheritance was proposed by

- (1) Robert Brown (2) Thomas Morgan

- (3) Sutton and Boveri (4) Gregor Mendel

Sol. Answer (3)

The chromosomal theory of inheritance was proposed by Sutton and Boveri in 1902-1903.

116. Which of the following statements is not correct?

- (1) The rhizome is thick, prostrate and branched
 (2) Rhizome is a condensed form of stem
 (3) The apical bud in rhizome always remains above the ground
 (4) The rhizome is aerial with no distinct nodes and internodes

Sol. Answer (4)

The rhizome is an underground stem modification with distinct nodes and internodes.

117. The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called as :

- (1) Secondary growth (2) Differentiation
 (3) Dedifferentiation (4) Redifferentiation

Sol. Answer (3)

The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called Dedifferentiation.

118. Match List-I with List-II ;

List-I	List-II
(a) Adenine	(i) Pigment
(b) Anthocyanin	(ii) Polysaccharide
(c) Chitin	(iii) Alkaloid
(d) Codeine	(iv) Purine

Choose the correct answer from the options given below .

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

Sol. Answer (2)

Adenine Purine (double ringed structure) found in both DNA and RNA)

Anthocyanin Pigment (secondary metabolite)

Chitin Homopolysaccharide of N-acetylglucosamine found in fungal cell wall

- and exoskeleton of Arthropods
- Codeine Alkaloid (secondary metabolite)
- 119.** The residual persistent part which forms the perisperm in the seeds of beet is :
- (1) Integument (2) Calyx
(3) Endosperm (4) Nucellus
- Sol. Answer (4)
- Perispermic Seeds – Seeds in which remains of nucellus are seen. The residual, persistent nucellus is called perisperm.
- Eg:- Black pepper, beet.
- 120.** The World Summit on sustainable development held in 2002 in Johannesburg, South Africa pledged for :
- (1) Collection and preservation of seeds of different genetic strains of commercially important plants.
(2) A significant reduction in the current rate of biodiversity loss.
(3) Declaration of more biodiversity hotspots.
(4) Increase in agricultural production.
- Sol. Answer (2)
- The World Summit on Sustainable Development held in 2002 in Johannesburg, South Africa, 190 countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels.
- 121.** The type of tissue commonly found in the fruit wall of nuts is
- (1) Sclereid (2) Parenchyma
(3) Collenchyma (4) Sclerenchyma
- Sol. Answer (1)
- Sclereids are present in
- (a) Fruit walls of nuts like walnuts, almonds, etc.
(b) Pulp of fruits like guava, pear, sapota (cheeku), etc
(c) Seed coats of legumes like peas, beans, etc.
(d) Leaves of Tea.
- 122.** The pioneer species in a hydrarch succession are :

- (1) Filamentous algae
(2) Free-floating angiosperms
(3) Submerged rooted plants
(4) Phytoplanktons

Sol. Answer (4)

Hydrarch Succession is the succession in aquatic habitat like a freshly formed pond is hydrosere.

Pioneer species: It is formed by phytoplanktons i.e., minute microscopic autotrophic organisms like diatoms, unicellular colonial or filamentous green algae and blue green algae.

123. Which of the following protects nitrogenase inside the root nodule of a leguminous plant ?

- (1) Glutamate dehydrogenase
(2) Catalase
(3) leg haemoglobin
(4) Transaminase

Sol. Answer (3)

The enzyme Nitrogenase is highly sensitive to the molecular oxygen \square It acquires anaerobic condition. The nodules have adaptations that ensure that the enzyme is protected from oxygen. To protect these enzymes, the nodule contains an oxygen scavenger called leg-haemoglobin.

124. Given below are two statements .

Statement I :

DNA polymerases catalyses polymerisation only in one direction, that is $5' \rightarrow 3'$

Statement II :

During replication of DNA, on one strand the replication is continuous while on the other strand it is discontinuous.

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 and Statement II are incorrect
(4) Statement I is correct but Statement II is incorrect

Sol. Answer (2)

The main enzyme for DNA replication is DNA Dependent DNA polymerase. It catalyses

polymerisation only in one direction, that is $5' \rightarrow 3'$

During DNA replication, replication on one strand is continuous with polarity $3' \rightarrow 5'$ while other strand is discontinuous with polarity $5' \rightarrow 3'$.

125. The species that come to appear in bare area are called

- (1) Species of seral community
- (2) Pioneer species
- (3) Invasive species
- (4) Competitive species

Sol. Answer (2)

The first biotic species that develops in a bare area is termed as pioneer species. Eg. Lichens on rock, phytoplanktons and zooplanktons in ponds, etc.

126. Initiation of lateral roots and vascular cambium during secondary growth takes place in cells of

- | | |
|---------------|----------------|
| (1) Pericycle | (2) Epiblema |
| (3) Cortex | (4) Endodermis |

Sol. Answer (1)

Pericycle is a primary tissue of plant roots and is the site for initiation of lateral roots and the secondary meristems, the vascular cambium and cork cambium (phellogen).

127. Match List - I with List - II

List - I

List - II

- | | |
|------------------------------------|------------------------------|
| (a) In lac operon i gene codes for | (i) transacetylase |
| (b) In lac operon z gene codes for | (ii) permease |
| (c) In lac operon y gene codes for | (iii) β -galactosidase |
| (d) In lac operon a gene codes for | (iv) Repressor |

Choose the correct answer from the options given below.

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

Sol. Answer (3)

Lac operon genes-

- (1) There are 3 structural genes
 - (a) Lac z \rightarrow Codes for β -galactosidase
 - (b) Lac y \rightarrow Codes for permease

(c) Lac a \rightarrow codes for transacetylase

(2) Operator gene

(3) Promoter gene

(4) Regulator gene: It codes for a protein known as repressor protein

128. To ensure that only the desired pollens fall on the stigma in artificial hybridization process

- (a) the female flower buds of plant producing unisexual flowers need not be bagged.
- (b) there is no need to emasculate unisexual flowers of selected female parent
- (c) emasculated flowers are to be bagged immediately after cross pollination
- (d) emasculated flowers are to be bagged after removal of anthers bisexual flowers, showing protogyny are never selected for cross

Choose the correct answer from the options given below :

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

Sol. Answer (3)

In Bisexual flower :

- (1) Emasculation \rightarrow Removal of anther from bisexual flower in immature stage.
- (2) Bagging \rightarrow Emasculated flowers are covered by bags. It is done to prevent undesirable cross pollination
- (3) Desired pollination
- (4) Rebagging
- (5) Tagging

In unisexual flower all the steps are same but emasculation is not done because it is not required

129. The ascent of xylem sap in plants is mainly accomplished by the.

- (1) root pressure
- (2) size of the stomatal aperture
- (3) distribution of stomata on the upper and lower epidermis
- (4) cohesion and adhesion between water molecules

Sol. Answer (4)

The transpiration driven ascent of xylem sap depends mainly on following physical properties of water molecules

- (a) Cohesion-mutual attraction between water molecules
- (b) Adhesion-attraction of water molecules to polar surfaces
- (c) Surface tension-water molecules are attracted to each other in liquid phase more than to water in gas phase.

130. Match List - I with List - II :

List - I**List - II**

- | | |
|---------------|----------------|
| (a) Imbricate | (i) Calotropis |
| (b) Valvate | (ii) Cassia |
| (c) Vexillary | (iii) Cotton |
| (d) Twisted | (iv) Bean |

Choose the correct answer from the options given below:

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

Sol. Answer (3)

Aestivation-Mode of arrangement of sepals or petals in a floral bud with respect to other member of same whorl is called aestivation. It is of following types-

- (a) Valvate-The margins of sepals or petals, present in whorl just touching each other. eg → *Calotropis*.
- (b) Twisted- Margin of one petal or sepal overlaps the margin of adjacent one. Eg- china rose, ladyfinger, cotton.
- (c) Imbricate-Margins of petals or sepals overlaps each other but not in a particular direction. Eg-*Cassia*, Gulmohar.
- (d) Vexillary-Largest petal(standard) overlaps two smaller lateral petals (wings) which in turn overlaps two smallest anterior petals (Keel) eg → Pea, bean flower.

131. The number of time(s) decarboxylation of isocitrate occurs during single TCA cycle is:

- | | |
|----------|-----------|
| (1) Four | (2) One |
| (3) Two | (4) Three |

Sol. Answer (2)

In single kreb's cycle, decarboxylation takes place at following two steps :

- (1) At 4th step, where isocitrate gives off a pair of H-atoms (oxidation) and a molecule of

CO₂ (decarboxylation) and becomes 5-C α -Ketoglutarate.

- (2) 5th step-where coenzyme-A reacts with α -Ketoglutarate forming 4-C Succinyl-Coenzyme A and releasing CO₂ and a pair hydrogen atoms.

The question is specifically asking for isocitrate so answer is (2)

132. Match List - I with List - II:

List -I**List -II**

- | | |
|---------------------------------|---|
| (a) Porins | (i) Pink coloured nodules |
| (b) leg haemoglobin | (ii) Lumen of thylakoid |
| (c) H ⁺ accumulation | (iii) Amphibolic pathway |
| (d) Respiration | (iv) Huge pores in outer membrane of mitochondria |

Choose the correct answer from the options given below :

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

Sol. Answer (3)

- (a) Porins-Types of proteins which forms pores of large size in the outer membranes of plastids such as chloroplast, mitochondria and membranes in bacteria.
- (b) Leg-Haemoglobin-Pink pigment in root nodules of leguminous plants, as soybean, that is essential for N₂ – fixation. It acts as O₂-scavenger
- (c) H⁺-accumulation → lumen of thylakoid.
- (d) Respiration–Amphibolic pathway → a biochemical pathway that includes both anabolic and catabolic processes.

133. Separation of DNA fragments is done by a technique known as

- (1) Gel electrophoresis
- (2) Polymerase Chain Reaction
- (3) Recombinant technology
- (4) Southern blotting

Sol. Answer (1)

The cutting of DNA by restriction endonucleases results in the formation of fragments of DNA. These fragments can be separated by a technique known as gel electrophoresis.

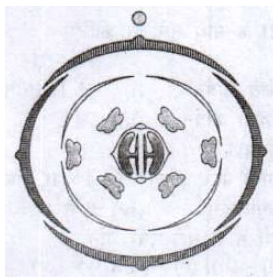
134. In general the egg apparatus of embryo sac in angiosperm consists of

- (1) One egg cell, two synergids, two antipodal cells, two Polar nuclei
- (2) One egg cell, two synergids, three antipodal cells, two Polar nuclei
- (3) One egg cell, two synergids, two antipodal cells, three Polar nuclei
- (4) One egg cell, three synergids, two antipodal cells, two Polar nuclei

Sol. Answer (0)

N/A

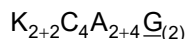
135. The Floral Diagram represents which one of the following families



- (1) Liliaceae
- (2) Fabaceae
- (3) Brassicaceae
- (4) Solanaceae

Sol. Answer (3)

The floral diagram represents Brassicaceae family.



Botany : Section-B (Q. No. 136 to 150)

136. Primary proteins are also called as polypeptides because :

- (1) They can assume many conformations
- (2) They are linear chains
- (3) They are polymers of peptide monomers
- (4) Successive amino acids are joined by peptide bonds

Sol. Answer (4)

Primary proteins are the linear chains of amino acids, joined by peptide bonds.

137. Match List-I with List-II :

- | List-I | List-II |
|-------------------------------|------------------------------------|
| (a) Bacteriophage ϕ X174 | (i) 48502 base pairs |
| (b) Bacteriophage Lambda | (ii) 5386 nucleotides |
| (c) <i>Escherichia coli</i> | (iii) 3.3×10^9 Base pairs |

- (d) Haploid content Of human DNA (iv) 4.6×10^6 base pairs

Choose the correct answer from the options given below :

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

Sol. Answer (4)

Length of DNA is defined as number of nucleotides or as base pairs.

It is a characteristic feature of an organism

$\phi \times 174$ – ssDNA–5386 nucleotides.

Bacteriophage Lambda and Linear DNA – 48502 bp

E coli and circular DNA – 4.6×10^6 bp

Haploid content of human DNA – 1 complete set of chromosomes – 3.3×10^9 bp

138. Which type of substance would face difficulty to pass through the cell membrane?

- (1) Substance soluble in lipids
- (2) Substance with hydrophobic moiety
- (3) Substance with hydrophilic moiety
- (4) All substance irrespective of hydrophobic and hydrophilic moiety

Sol. Answer (3)

Diffusion of any substance across the membrane depends on its solubility in lipids. Since the cell membrane is majorly composed of lipids, substances having hydrophilic moiety find it difficult to pass through the membrane, their movement has to be facilitated.

139. What is the expected percentage of F₂ progeny with yellow and inflated pod in dihybrid cross experiment involving pea plants with green coloured, inflated pod and yellow coloured constricted pod?

- (1) 9%
- (2) 100%
- (3) 56.25%
- (4) 18.75%

Sol. Answer (4)

Green, Inflated Pod X yellow, constricted Pod

↓
F₁ – All green, inflated

↓
F₂ – 9 : 3 : 3 : 1 – Phenotypic ratio.

9 – Green inflated

3 – Green, constricted

3 – Yellow, inflated

1 – Yellow, constricted

Since, yellow inflated (recombinants) are

$$\frac{3}{16} = 18.75\%$$

140. Match List-I with List-II :

List-I

List-II

- | | |
|--|--------------------------|
| (a) Carbon dissolved | (i) 55 billion tons |
| (b) Annual fixation of Carbon through Photosynthesis | (ii) 71% |
| (c) PAR captured by Plants | (iii) 4×10^3 kg |
| (d) Productivity of oceans | (iv) 2 to 10% |

Choose the correct answer from the options given below:

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

Sol. Answer (4)

71% of carbon found dissolved in oceans. Oceans acts as the largest carbon sink/reservoir and regulates amount of CO₂ in atmosphere.

Annual fixation of carbon through Photosynthesis – 4×10^{13} Kg – according to an estimate, out of the total incident light received by earth, only 50% is suitable for Photosynthesis – PAR (Photosynthetically active radiation)

Productivity of oceans is only 55 billion tons due to low nitrogen, organic nutrients.

141. If a female individual is with small round head, furrowed tongue, partially open mouth and broad palm with characteristic palm crease. Also the physical, psychomotor and mental

development is retarded. The karyotype analysis of such an individual will show

- (1) Trisomy of chromosome 21
- (2) 47 chromosomes with XXY sex chromosomes
- (3) 45 chromosomes with XO sex chromosomes
- (4) 47 Chromosomes with XYY sex chromosomes

Sol. Answer (1)

Karyotype is a preparation of complete set of metaphase chromosomes in an individual organism/cell.

Trisomy of 21/Down's syndrome is presence of an additional 21st chromosome. This is a type of Aneuploidy. $[2n + 1]$

Aneuploidy is a result of failure of segregation of chromosomes (Non-disjunction) during gamete formation (meiosis I/II)

142. Read the following statements and identify the characters related to the alga shown in the diagram



- (a) It is a member of Chlorophyceae
- (b) Food is stored in the form of starch
- (c) It is a monoecious plant showing oogonium and antheridium
- (d) Food is stored in the form of laminarin or mannitol
- (e) It shows dominance of pigments Chlorophyll a, c and Fucoxanthin

Choose the correct answer from the options given below :

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

Sol. Answer (3)

- Chara - is a member of chlorophyceae (green algae)
- Food is stored in Pyrenoid bodies. Pyrenoid body majorly contains starch around a protein axis.
- Chara is a monoecious plant. Male and female sex organs are located on the same plant body.
- Laminarin and mannitol are storage food of Brown algae.
- Chlorophyll a, c and fucoxanthin are predominant pigments in brown algae.

143. Match List - I with List - II :

List-I	List-II
(a) Sacred groves	(i) Alien species
(b) Zoological park	(ii) Release of large quantity of oxygen
(c) Nile perch	(iii) Ex-situ conservation
(d) Amazon forest	(iv) Khasi Hills in Meghalaya

Choose the correct answer from the options given below:

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

Sol. Answer (2)

Sacred groves are tracts of forests conserved by people due to religions, cultural beliefs that emphasize protection of nature. Khasi hills, Meghalaya is one such area.

Threatened animals, taken out from natural habitats are given special care at a special setting- *Ex-situ* conservation.

Zoological park is one such way of conservation.

Nile perch(fish) introduced in lake Victoria, Africa led to extinction of more than 200 species of native, cichlid fish. So, Nile perch is example of Alien species invasion. Amazon forest covering more than 14% of earth's land surface, release large amount of O₂.

144. The enzyme (a) is needed for isolating genetic material from plant cells and enzyme (b) for isolating genetic material from fungus. Choose the correct pair of options from the following:

- (a) Cellulase (b) Lipase
- (a) Cellulase (b) Protease
- (a) Cellulase (b) Chitinase
- (a) Chitinase (b) Lipase

Sol. Answer (3)

The genetic material from cells can be separated by lysing the cell wall, if present. The cell wall in plant cells is digested by cellulase and in fungal cells by chitinase enzyme.

145. Identify the correct sequence of events during Prophase I of meiosis :

- Synapsis of homologous chromosomes
- Chromosomes become gradually visible under microscope
- Crossing over between non-sister chromatids of homologous chromosomes
- Terminalisation of chiasmata
- Dissolution of synaptonemal complex

Choose the correct answer from the options given below:

- (a), (c), (d), (e), (b)
- (a), (b), (c), (d), (e)
- (b), (c), (d), (e), (a)
- (b), (a), (c), (e), (d)

Sol. Answer (4)

During meiosis-I, in prophase I, firstly chromatin network condenses gradually which is visible as chromosomes under microscope.

Homologous chromosomes pair up in a process called synapsis.

Crossing over is the exchange of genetic material between non-sister chromatids of homologous chromosomes.

The paired chromosomes move apart due to dissolution of the protein laden-synaptonemal complex.

The actual point at which crossing over takes place is visualized as 'X' shaped structure called chiasmata.

146. Which of the following pair represents free living nitrogen fixing aerobic bacteria?

- (1) *Pseudomonas* and *Thiobacillus*
- (2) *Rhizobium* and *Beijernickia*
- (3) *Azotobacter* and *Beijernickia*
- (4) *Anabaena* and *Rhodospirillum*

Sol. Answer (3)

Atmospheric N_2 cannot be utilized by living organisms. Few prokaryotes can reduce nitrogen (N_2) into ammonia-Biological Nitrogen Fixation.

N_2 fixing bacteria can be free living or symbiotic.

Azotobacter, *Beijernickia* - Free living N_2 fixers.

147. Frugivorous birds are found in large numbers in tropical forests mainly because of :

- (1) temperature conducive for their breeding
- (2) lack of niche specialisation
- (3) higher annual rainfall
- (4) availability of fruits throughout the year

Sol. Answer (4)

Tropical environments are less seasonal, more constant or predictable. This promotes Niche specialization, greater species diversity. Moreover, high solar energy contributes to high productivity.

148. Identify the correct statements regarding chemiosmotic hypothesis:

- (a) Splitting of the water molecule takes place on the inner side of the membrane.
 - (b) Protons accumulate within the lumen of the thylakoids.
 - (c) Primary acceptor of electron transfers the electrons to an electron carrier.
 - (d) NADP reductase enzyme is located on the stroma side of the membrane.
 - (e) Protons increase in number in stroma.
- Choose the correct answer from the options given below :

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

Sol. Answer (3)

During light reactions, Statement (c) is incorrect because the electron from primary acceptor is transferred to a proton carrier (PQ) but not an electron carrier. Statement (e) is incorrect as the proton concentration relatively increases in the lumen of thylakoid and decreases on the stromal side.

149. Match List-I with List-II :

List-I	List-II
(a) Gene gun	(i) Replacement of a faulty gene by a normal healthy gene
(b) Gene therapy	(ii) Used for transfer of Gene
(c) Gene cloning	(iii) Total DNA in the cells of an organism
(d) Genome	(iv) To obtain identical copies of a particular DNA molecule

Choose the correct answer from the options given below :

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

Sol. Answer (2)

Gene gun	Used to transfer DNA in plant cells
Gene therapy	Replacement of defective gene a faculty gene by normal functional gene
Gene cloning	To obtain identical copies of desired gene
Genome	Total DNA content in the cell of an organism

150. Which of the following can be expected if scientists succeed in introducing apomictic gene varieties of crops

- (1) There will be segregation of the desired characters only in the progeny
- (2) Polyembryony will be seen and each seed will produce many plantlets
- (3) Seeds of hybrid plants will show longer dormancy
- (4) Farmers can keep on using the seeds produced by the hybrids to raise new crop year after year

Sol. Answer (4)

Apomixis is a phenomenon in which seeds are formed from unfertilized nucleus or egg cell, such seeds produce plantlets identical to parent plant (hybrid plant) So, farmers can keep using these apomictic seeds to raise new crops year after year.

