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BIOLOGY NEET 2024

TEST PAPER WITH ANSWER

101. Auxin is used by gardeners to prepare weed-free lawns. But no damage is caused to grass as auxin

(1) promotes abscission of mature leaves only.

(2) does not affect mature monocotyledonous plants.

(3) can help in cell division in grasses, to produce growth.

(4) promotes apical dominance.

Answer (2)

Sol. Auxin does not affect mature monocot plants. In monocots, especially grasses show limited translocation and cause rapid degradation of external auxin.

102. Lecithin, a small molecular weight organic compound found in living tissues, is an example of:

(1) Phospholipids (2) Glycerides

(3) Carbohydrates (4) Amino acids

Answer (1)

Sol. The correct answer is option (1).

Some lipids have phosphorous and a phosphorylated organic compound in them. These are phospholipids. They are found in cell membrane. Lecithin is one example.

Option (2) is incorrect as glycerides are another group of lipids in which both glycerol and fatty acids are present.

Option (3) and (4) are incorrect as amino acids and carbohydrates are separate groups of biomolecules.

103. Match List I with List II

	List I		**List II**
A.	Two or more alternative forms of a gene	I.	Back cross
B.	Cross of F_1 progeny with homozygous recessive parent	II.	Ploidy
C.	Cross of F_1 progeny with any of the parents	III.	Allele
D.	Number of chromosome sets in plant	IV.	Test cross

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

(1) A-II, B-I, C-III, D-IV (2) A-III, B-IV, C-I, D-II

(3) A-IV, B-III, C-II, D-I (4) A-I, B-II, C-III, D-IV

Answer (2)

Sol. A. Two or more alternative forms of gene are called alleles.

B. Cross of F_1 progeny with homozygous recessive parent is a test cross.

C. Cross of F_1 progeny with any of the parents is a back cross.

D. Number of chromosome sets in plant is called ploidy.

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

A. The flowers of *Vallisneria* are colourful and produce nectar.

B. The flowers of water lily are not pollinated by water.

C. In most of water-pollinated species, the pollen grains are protected from wetting.

D. Pollen grains of some hydrophytes are long and ribbon like.

E. In some hydrophytes, the pollen grains are carried passively inside water.

Choose the correct answer from the options given below.

(1) A, B, C and D only

(2) A, C, D and E only

(3) B, C, D and E only

(4) C, D and E only

Answer (3)

Sol. Flowers of *Vallisneria* are not colourful and do not produce nectar. Waterlily is pollinated by insect or wind. In water-pollinated species, pollen grains are protected from wetting by a mucilaginous covering. In some hydrophytes such as *Vallisneria* pollen grains are carried passively by water current.

105. List of endangered species was released by

(1) WWF (2) FOAM

(3) IUCN (4) GEAC

Answer (3)

Sol. List of endangered species was released by – IUCN.

106. What is the fate of a piece of DNA carrying only gene of interest which is transferred into an alien organism?

A. The piece of DNA would be able to multiply itself independently in the progeny cells of the organism.

B. It may get integrated into the genome of the recipient.

C. It may multiply and be inherited along with the host DNA.

D. The alien piece of DNA is not an integral part of chromosome.

E. It shows ability to replicate.

Choose the correct answer from the options given below:

(1) D and E only (2) B and C only

(3) A and E only (4) A and B only

Answer (2)

Sol. Correct answer is option (2) because

The fate of a piece of DNA carrying only gene of interest which is transferred into an alien organism are:

(B) It may get integrated into the genome of the recipient

(C) It may multiply and be inherited along with the host DNA

$\Rightarrow$ This piece of DNA would not be able to multiply itself in the progeny cells of the organism but when gets integrated into the genome of the recipient, it may multiply and be inherited along with the host DNA.

107. Which of the following are required for the dark reaction of photosynthesis?

A. Light

B. Chlorophyll

C. CO_2

D. ATP

E. NADPH

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

(1) B, C and D only

(2) C, D and E only

(3) D and E only

(4) A, B and C only

Answer (2)

Sol. For dark reaction of photosynthesis there are the requirement of

$$\left.\begin{array}{l} CO_2 \\ ATP \\ NADPH \end{array}\right]$$

108. The type of conservation in which the threatened species are taken out from their natural habitat and placed in special setting where they can be protected and given special care is called

(1) Biodiversity conservation

(2) Semi-conservative method

(3) Sustainable development

(4) *in-situ* conservation

Answer (1)

Sol. The type of conservation in which threatened species are taken out from their natural habitat and placed in special setting where they can be protected and given special care is called ***ex-situ*** conservation which is a type of biodiversity conservation.

109. Given below are two statements:

Statement I : Bt toxins are insect group specific and coded by a gene *cry* IAc.

Statement II : Bt toxin exists as inactive protoxin in *B. thuringiensis*. However, after ingestion by the insect the inactive protoxin gets converted into active form due to acidic pH of the insect gut.

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

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Answer (2)

Sol. The correct answer is option (2) as specific Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into the several crop plants such as cotton. The choice of genes depends upon the crop and the targeted pest as most Bt toxins are insect-group specific. The toxin is coded by a gene named *cry*. There are a number of them, for example, the proteins encoded by the genes *cry* IAc and *cry* IIAb control the cotton bollworms, that of *cry* IAb controls corn borer.

110. A transcription unit in DNA is defined primarily by the three regions in DNA and these are with respect to upstream and down stream end;

(1) Structural gene, Transposons, Operator gene

(2) Inducer, Repressor, Structural gene

(3) Promotor, Structural gene, Terminator

(4) Repressor, Operator gene, Structural gene

Answer (3)

Sol. A transcription unit of DNA is defined primarily by the three regions in the DNA:

(i) A promoter

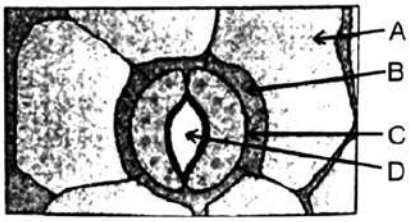
(ii) The structural gene

(iii) A terminator

The promoter is said to be located towards 5′-end (upstream) of the structural gene (the reference is made with respect to the polarity of coding strand)

The terminator is located towards 3′-end (downstream) of the coding strand.

111. In the given figure, which component has thin outer walls and highly thickened inner walls?



(1) D

(2) A

(3) B

(4) C

Answer (4)

Sol. Guard cells of stomata have thin outer wall and highly thickened inner walls.

112. Hind II always cuts DNA molecules at a particular point called recognition sequence and it consists of:

(1) 6 bp

(2) 4 bp

(3) 10 bp

(4) 8 bp

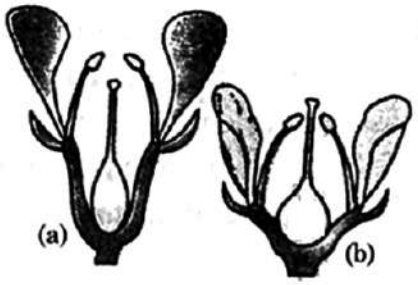
Answer (1)

Sol. The correct answer is option (1).

The first restriction endonuclease – *Hin*d II, whose functioning depends on a specific DNA nucleotide sequence was isolated. It was found that *Hin*d II always cut DNA molecules at a particular point by recognising sequence of six base pairs.

Option (2), (3) and (4) are incorrect because they have either more than 6 or less than 6 bp.

113. Identify the type of flowers based on the position of calyx, corolla and androecium with respect to the ovary from the given figures (a) and (b)



(1) (a) Hypogynous; (b) Epigynous

(2) (a) Perigynous; (b) Epigynous

(3) (a) Perigynous; (b) Perigynous

(4) (a) Epigynous; (b) Hypogynous

Answer (3)

Sol. If gynoecium is situated in the centre and other parts of the flower are located on the rim of the thalamus almost at the same level, it is called perigynous.

Both diagram shows perigynous condition.

114. Which of the following is an example of actinomorphic flower?

(1) *Cassia* (2) *Pisum*

(3) *Sesbania* (4) *Datura*

Answer (4)

Sol. *Datura* shows actinomorphic flower. In *Cassia*, *Pisum* and *Sesbania*, zygomorphic flowers are seen.

115. Which one of the following is <u>not</u> a criterion for classification of fungi?

(1) Mode of nutrition (2) Mode of spore formation

(3) Fruiting body (4) Morphology of mycelium

Answer (1)

Sol. The morphology of the mycelium, mode of spore formation and fruiting bodies form the basis for the division of the kingdom fungi into various classes.

116. The equation of Verhulst-Pearl logistic growth is $\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$.

From this equation, K indicates:

(1) Biotic potential

(2) Carrying capacity

(3) Population density

(4) Intrinsic rate of natural increase

Answer (2)

Sol. In the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$, K represents carrying capacity.

117. Which one of the following can be explained on the basis of Mendel's Law of Dominance?

A. Out of one pair of factors one is dominant and the other is recessive.

B. Alleles do not show any expression and both the characters appear as such in F_2 generation.

C. Factors occur in pairs in normal diploid plants.

D. The discrete unit controlling a particular character is called factor.

E. The expression of only one of the parental characters is found in a monohybrid cross.

Choose the correct answer from the options given below:

(1) A, C, D and E only

(2) B, C and D only

(3) A, B, C, D and E

(4) A, B and C only

Answer (1)

Sol. According to Law of Dominance

(1) Characters are controlled by discrete units called factors

(2) Factors occur in pairs

(3) In a dissimilar pair of factors one member of the pair dominates (dominant) the other recessive

The law of dominance is used to explain the expression of only one of the parental characters in a monohybrid cross.

Law of segregation is based on the fact that the alleles do not show any expression and both the characters are recovered as such in F_2 generation

118. Match List I with List II

	List-I		**List-II**
A.	*Rhizopus*	I.	Mushroom
B.	*Ustilago*	II.	Smut fungus
C.	*Puccinia*	III.	Bread mould
D.	*Agaricus*	IV.	Rust fungus

Choose the correct answer from the options given below:

(1) A-I, B-III, C-II, D-IV

(2) A-III, B-II, C-I, D-IV

(3) A-IV, B-III, C-II, D-I

(4) A-III, B-II, C-IV, D-I

Answer (4)

Sol. *Rhizopus* is a bread mould fungus. *Ustilago* is a smut fungi. *Puccinia is known as rust fungi. Agaricus* is commonly called mushroom.

A-III

B-II

C-IV

D-I

119. Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:

(1) Feedback inhibition
(2) Competitive inhibition
(3) Enzyme activation
(4) Cofactor inhibition

Answer (2)

Sol. Correct answer is option (2) because malonate shows close structural similarity with the substrate and it competes with the substrate for the substrate binding site of the enzyme succinic dehydrogenase. Option (1), (3) and (4) are incorrect as enzyme activation, co-factor inhibition are not showing structural similarity with substrate.

120. Formation of interfascicular cambium from fully developed parenchyma cells is an example for

(1) Redifferentiation
(2) Dedifferentiation
(3) Maturation
(4) Differentiation

Answer (2)

Sol. The phenomenon of formation of interfascicular cambium from fully differentiated parenchyma cells is called dedifferentiation.

121. A pink flowered Snapdragon plant was crossed with a red flowered Snapdragon plant. What type of phenotype/s is/are expected in the progeny?

(1) Red flowered as well as pink flowered plants
(2) Only pink flowered plants
(3) Red, Pink as well as white flowered plants
(4) Only red flowered plants

Answer (1)

Sol. Pink colour flower in snapdragon have genotype **Rr**

Red flowered snapdragon have genotype **RR** when they both are crossed

♂ / ♀	R	R
R	RR	RR
r	Rr	Rr

Phenotype

Red : Pink : White

2 2 0

So the progeny that we get are red and pink flowered plants only

122. In a plant, black seed color (BB/Bb) is dominant over white seed color (bb). In order to find out the genotype of the black seed plant, with which of the following genotype will you cross it?

(1) bb
(2) Bb
(3) BB/Bb
(4) BB

Answer (1)

Sol. To determine the genotype of a black seed colour at F_2, the black seed from F_2 is crossed with the white seed colour. This is called a test cross.

$\therefore$ To determine the genotype of (BB/Bb) black seed we need to cross them with white seed *i.e.* bb.

123. Match List I with List II

List I		List II	
A.	*Clostridium butylicum*	I.	Ethanol
B.	*Saccharomyces cerevisiae*	II.	Streptokinase
C.	*Trichoderma polysporum*	III.	Butyric acid
D.	*Streptococcus sp.*	IV.	Cyclosporin-A

Choose the correct answer from the options given below:

(1) A-II, B-IV, C-III, D-I

(2) A-III, B-I, C-IV, D-II

(3) A-IV, B-I, C-III, D-II

(4) A-III, B-I, C-II, D-IV

Answer (2)

Sol. A. *Clostridium butylicum* — Butyric acid

B. *Saccharomyces cerevisiae* — Ethanol

C. *Trichoderma polysporum* — Cyclosporin-A

D. *Streptococcus sp.* — Streptokinase

124. How many molecules of ATP and NADPH are required for every molecule of CO_2 fixed in the Calvin cycle?

(1) 2 molecules of ATP and 2 molecules of NADPH

(2) 3 molecules of ATP and 3 molecules of NADPH

(3) 3 molecules of ATP and 2 molecules of NADPH

(4) 2 molecules of ATP and 3 molecules of NADPH

Answer (3)

Sol. For fixation of 1 molecule of CO_2 in Calvin cycle 3 ATP molecules and 2 NADPH molecules are required.

125. The capacity to generate a whole plant from any cell of the plant is called:

(1) Micropropagation

(2) Differentiation

(3) Somatic hybridization

(4) Totipotency

Answer (4)

Sol. Totipotency is defined as the capacity to generate a whole plant from any cell of the plant.

126. Tropical regions show greatest level of species richness because

A. Tropical latitudes have remained relatively undisturbed for millions of years, hence more time was available for species diversification.

B. Tropical environments are more seasonal.

C. More solar energy is available in tropics.

D. Constant environments promote niche specialization.

E. Tropical environments are constant and predictable.

Choose the correct answer from the options given below.

(1) A and B only

(2) A, B and E only

(3) A, B and D only

(4) A, C, D and E only

Answer (4)

Sol. Only statement B is incorrect because tropical environments unlike temperate ones, are less seasonal, relatively more constant and predictable.

Thus statements A, C, D and E are correct.

127. Match List I with List II

	List-I		**List-II**
A.	Nucleolus	I.	Site of formation of glycolipid
B.	Centriole	II.	Organization like the cartwheel
C.	Leucoplasts	III.	Site for active ribosomal RNA synthesis
D.	Golgi apparatus	IV.	For storing nutrients

Choose the correct answer from the options given below:

(1) A-II, B-III, C-I, D-IV

(2) A-III, B-IV, C-II, D-I

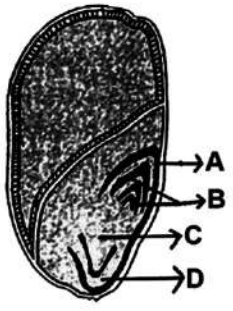
(3) A-I, B-II, C-III, D-IV

(4) A-III, B-II, C-IV, D-I

Answer (4)

Sol.
- Nucleolus is a site for active ribosomal RNA synthesis
- Both the centrioles in a centrosome lie perpendicular to each other in which each has an organisation like the cartwheel.
- Leucoplasts are the colourless plastids of varied shapes and sizes with stored nutrients.
- Golgi apparatus is the important site for formation of glycoproteins and glycolipids.

128. Identify the part of the seed from the given figure which is destined to form root when the seed germinates.



(1) B

(2) C

(3) D

(4) A

Answer (2)

Sol. Radicle is destined to form root.

In the given diagram 'C' represent radicle

129. Spindle fibers attach to kinetochores of chromosomes during

(1) Metaphase

(2) Anaphase

(3) Telophase

(4) Prophase

Answer (1)

Sol. Spindle fibers attach to kinetochores of chromosome in metaphase stage.

130. Given below are two statements:

Statement I : Chromosomes become gradually visible under light microscope during leptotene stage.

Statement II : The beginning of diplotene stage is recognized by dissolution of synaptonemal complex.

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

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Answer (4)

Sol.
- During leptotene stage the chromosomes become gradually visible under the light microscope.
- The beginning of diplotene is recognised by the dissolution of the synaptonemal complex and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the site of crossover.

Thus both statement I and II are correct.

131. Given below are two statements:

Statement I : Parenchyma is living but collenchyma is dead tissue.

Statement II : Gymnosperms lack xylem vessels but presence of xylem vessels is the characteristic of angiosperms.

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

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Answer (3)

Sol. Collenchyma is also living tissue.

Gymnosperm lack xylem vessels but presence of xylem vessels is the characteristic of angiosperm.

132. These are regarded as major causes of biodiversity loss:

A. Over exploitation

B. Co-extinction

C. Mutation

D. Habitat loss and fragmentation

E. Migration

Choose the correct option:

(1) A, B, C and D only

(2) A, B and E only

(3) A, B and D only

(4) A, C and D only

Answer (3)

Sol. Major causes of biodiversity losses are

(1) Over-exploitation

(2) Alien species invasions

(3) Co-extinctions

(4) Habitat loss and fragmentation

Hence correct option is A, B and D only.

133. The lactose present in the growth medium of bacteria is transported to the cell by the action of

(1) Acetylase

(2) Permease

(3) Polymerase

(4) Beta-galactosidase

Answer (2)

Sol. The *y* gene *lac* operon codes for permease enzyme, which increase the permeability of cell to β-galactosides.

So, the lactose present in the growth medium of bacteria is transported into the cell by the action of permease.

134. Bulliform cells are responsible for

(1) Protecting the plant from salt stress.

(2) Increased photosynthesis in monocots.

(3) Providing large spaces for storage of sugars.

(4) Inward curling of leaves in monocots.

Answer (4)

Sol. In grasses, certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called bulliform cells. When the bulliform cells in the leaves have absorbed water and are turgid, the leaf surface is exposed. When they are flaccid due to water stress, they make the leaves curl inwards to minimise water loss.

135. The cofactor of the enzyme carboxypeptidase is:

(1) Niacin
(2) Flavin
(3) Haem
(4) Zinc

Answer (4)

Sol. The correct answer is option (4) as the cofactor of the enzyme carboxypeptidase is zinc.

Niacin is associated with coenzyme NAD and NADP.

Option (3) is incorrect as haem is the prosthetic group in peroxidase and catalase.

136. Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae,

A. Asexual reproduction occurs usually by biflagellate zoospores.
B. Sexual reproduction is by oogamous method only.
C. Stored food is in the form of carbohydrates which is either mannitol or laminarin.
D. The major pigments found are chlorophyll a, c and carotenoids and xanthophyll.
E. Vegetative cells have a cellulosic wall, usually covered on the outside by gelatinous coating of algin.

Choose the correct answer from the options given below:

(1) B, C, D and E only
(2) A, C, D and E only
(3) A, B, C and E only
(4) A, B, C and D only

Answer (2)

Sol. In members of Phaeophyceae sexual reproduction is by oogamous, isogamous or anisogamous methods.

Therefore correct set of statements are A, C, D and E.

137. Match List I with List II

List I	**List II**
A. Robert May	I. Species-Area relationship
B. Alexander von Humboldt	II. Long term ecosystem experiment using out door plots
C. Paul Ehrlich	III. Global species diversity at about 7 million
D. David Tilman	IV. Rivet popper hypothesis

Choose the correct answer from the options given below:

(1) A-III, B-I, C-IV, D-II
(2) A-I, B-III, C-II, D-IV
(3) A-III, B-IV, C-II, D-I
(4) A-II, B-III, C-I, D-IV

Sol. Robert May places the global species diversity at about 7 million.

Alexander von Humboldt gave species-area relationship.

Paul Ehrlich used an analogy "Rivet popper hypothesis" to explain the role of species in the ecosystem.

David Tilman performed long term ecosystem experiments using out door plots.

138. Given below are two statements:

Statement I: In C_3 plants, some O_2 binds to RuBisCO, hence CO_2 fixation is decreased.

Statement II: In C_4 plants, mesophyll cells show very little photorespiration while bundle sheath cells do not show photorespiration.

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

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Answer (2)

Sol. In C_3 plant, some O_2 bind to RuBisCO, and hence CO_2 fixation is decreased. Statement II is incorrect, photorespiration does not occur in C_4 plants as they lack RuBisCO in mesophyll. Hence statement I is the only correct option.

139. The DNA present in chloroplast is:

(1) Circular, double stranded

(2) Linear, single stranded

(3) Circular, single stranded

(4) Linear, double stranded

Answer (1)

Sol. The DNA present in chloroplast is circular double stranded.

140. In an ecosystem if the Net Primary Productivity (NPP) of first trophic level is $100x$ (kcal m^{-2}) yr^{-1}, what would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem?

(1) $x(\text{kcal m}^{-2})\text{yr}^{-1}$

(2) $10x(\text{kcal m}^{-2})\text{yr}^{-1}$

(3) $\frac{100x}{3x}(\text{kcal m}^{-2})\text{yr}^{-1}$

(4) $\frac{x}{10}(\text{kcal m}^{-2})\text{yr}^{-1}$

Answer (2)

Sol. NPP at first trophic level would be the GPP for second trophic level. NPP at second trophic level would be GPP for third trophic level. Therefore, $100x$ (kcal/m^2/yr) would be GPP at second trophic level and $100x \times 10\%$ (kcal/m^2/yr) *i.e.*, $10x$ (kcal/m^2/yr) energy would be GPP at third trophic level.

141. Which of the following are fused in somatic hybridization involving two varieties of plants?

(1) Somatic embryos

(2) Protoplasts

(3) Pollens

(4) Callus

Answer (2)

Sol. Protoplast of two varieties of plants are fused in somatic hybridization.

142. Match List I with List II

	List I		**List II**
A.	Citric acid cycle	I.	Cytoplasm
B.	Glycolysis	II.	Mitochondrial matrix
C.	Electron transport system	III.	Intermembrane space of mitochondria
D.	Proton gradient	IV.	Inner mitochondrial membrane

Choose the correct answer from the options given below:

(1) A-II, B-I, C-IV, D-III

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-III, C-II, D-I

(4) A-I, B-II, C-III, D-IV

Answer (1)

Sol. Citric acid cycle occurs in mitochondrial matrix.

Glycolysis occurs in cytosol in most of the organism.

Electron transport system is present in the inner mitochondrial membrane.

Proton gradient is formed across the intermembrane space of mitochondria.

143. Match List I with List II

	List I		**List II**
A.	Frederick Griffith	I.	Genetic code
B.	Francois Jacob & Jacque Monod	II.	Semi-conservative mode of DNA replication
C.	Har Gobind Khorana	III.	Transformation
D.	Meselson & Stahl	IV.	*Lac* operon

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-I, D-II

(2) A-II, B-III, C-IV, D-I

(3) A-IV, B-I, C-II, D-III

(4) A-III, B-II, C-I, D-IV

Answer (1)

Sol. Frederick Griffith series of experiment witness miraculous transformation in the bacteria.

The elucidation of *Lac* operon was a result of a close association between geneticist, Francois Jacob and a biochemist, Jacques Monod.

Meselson and Stahl gave semi-conservative mode of DNA replication.

Har Gobind Khorana developed chemical method to define combination of bases in genetic code.

144. Match List I with List II

	List I (Types of Stamens)		**List II (Example)**
A.	Monoadelphous	I.	Citrus
B.	Diadelphous	II.	Pea
C.	Polyadelphous	III.	Lily
D.	Epiphyllous	IV.	China-rose

Choose the correct answer from the options given below:

(1) A-IV, B-I, C-II, D-III (2) A-I, B-II, C-IV, D-III

(3) A-III, B-I, C-IV, D-II (4) A-IV, B-II, C-I, D-III

Answer (4)

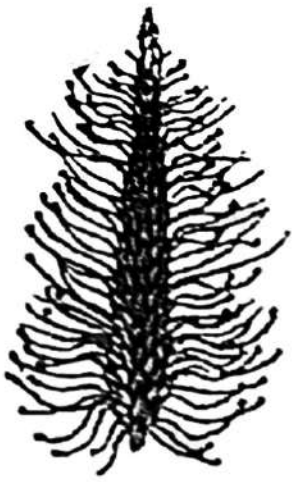
Sol. In China rose monoadelphous androecium is present.

Diadelphous androecium is found in pea plant.

Polyadelphous androecium is found in citrus.

Epiphyllous androecium is found in lily.

145. Identify the correct description about the given figure:



(1) Water pollinated flowers showing stamens with mucilaginous covering.

(2) Cleistogamous flowers showing autogamy.

(3) Compact inflorescence showing complete autogamy

(4) Wind pollinated plant inflorescence showing flowers with well exposed stamens.

Answer (4)

Sol. The given diagram shows a wind pollinated plant showing compact inflorescence and well exposed stamens.

Stamens are exposed so complete autogamy does not occur.

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

List-I	**List-II**
A. GLUT-4	I. Hormone
B. Insulin	II. Enzyme
C. Trypsin	III. Intercellular ground substance
D. Collagen	IV. Enables glucose transport into cells

Choose the correct answer from the options given below.

(1) A-I, B-II, C-III, D-IV

(2) A-II, B-III, C-IV, D-I

(3) A-III, B-IV, C-I, D-II

(4) A-IV, B-I, C-II, D-III

Answer (4)

Sol. Correct answer is option (4)

A. GLUT-4	IV. Enables glucose transport into cells
B. Insulin	I. Hormone
C. Trypsin	II. Enzyme
D. Collagen	III. Intercellular ground substance

147. Identify the step in tricarboxylic acid cycle, which does not involve oxidation of substrate.

(1) Succinic acid $\rightarrow$ Malic acid

(2) Succinyl-CoA $\rightarrow$ Succinic acid

(3) Isocitrate $\rightarrow$ α-ketoglutaric acid

(4) Malic acid $\rightarrow$ Oxaloacetic acid

Answer (2)

Sol. Oxidation involves the loss of electrons (often as part of hydrogen) from a molecule, leaving to an increase in its oxidation state. This process is typically associated with the transfer of electrons to an electron acceptor which is reduced in the process.

The conversion of succinyl CoA to succinic acid does not involve oxidation of substrate.

148. Spraying sugarcane crop with which of the following plant growth regulators, increases the length of stem, thus, increasing the yield?

(1) Gibberellin

(2) Cytokinin

(3) Abscisic acid

(4) Auxin

Answer (1)

Sol. Sugarcanes store carbohydrate as sugar in their stems. Spraying sugarcane crop with gibberellins increases the length of the stem, thus increasing the yield.

149. Match List I with List II

	List I		**List II**
A.	Rose	I.	Twisted aestivation
B.	Pea	II.	Perigynous flower
C.	Cotton	III.	Drupe
D.	Mango	IV.	Marginal placentation

Choose the correct answer from the options given below :

(1) A-I, B-II, C-III, D-IV

(2) A-IV, B-III, C-II, D-I

(3) A-II, B-III, C-IV, D-I

(4) A-II, B-IV, C-I, D-III

Answer (4)

Sol. Rose have half-inferior ovary, thus it is known as Perigynous flower.

In Pea, the placenta form a ridge along the ventral suture of the ovary and ovules are borne on this ridge forming two rows.

In Cotton, twisted aestivation is present.

In Mango, fruit is drupe.

150. Which of the following statement is correct regarding the process of replication in *E.coli*?

(1) The DNA dependent RNA polymerase catalyses polymerization in one direction, that is 5' $\rightarrow$ 3'

(2) The DNA dependent DNA polymerase catalyses polymerization in 5' $\rightarrow$ 3' as well as 3' $\rightarrow$ 5' direction

(3) The DNA dependent DNA polymerase catalyses polymerization in 5' $\rightarrow$ 3' direction

(4) The DNA dependent DNA polymerase catalyses polymerization in one direction that is 3' $\rightarrow$ 5'

Answer (3)

Sol. In Prokaryotes, like *E.coli* during replication, the DNA dependent DNA polymerase catalyse polymerization only in one direction, that is 5' $\rightarrow$ 3'

151. Match List I with List II :

	List I		List II
A.	Pons	I.	Provides additional space for Neurons, regulates posture and balance.
B.	Hypothalamus	II.	Controls respiration and gastric secretions.
C.	Medulla	III.	Connects different regions of the brain.
D.	Cerebellum	IV.	Neuro secretory cells

Choose the correct answer from the options given below :

(1) A-III, B-IV, C-II, D-I

(2) A-I, B-III, C-II, D-IV

(3) A-II, B-I, C-III, D-IV

(4) A-II, B-III, C-I, D-IV

Answer (1)

Sol. The correct answer is option (1) as

A.	Pons	–	Part of hindbrain, it connects different regions of the brain.
B.	Hypothalamus	–	Also have neuro secretory cells which secrete hormones.
C.	Medulla oblongata	–	Part of hindbrain which controls respiration and gastric secretions.
D.	Cerebellum	–	Part of hindbrain with convoluted surface which provides additional space for neurons, also regulates posture and balance.

152. Which of the following is not a component of Fallopian tube?

(1) Isthmus

(2) Infundibulum

(3) Ampulla

(4) Uterine fundus

Answer (4)

Sol. The correct answer is option (4) as uterine fundus is the upper, dome-shaped part of the uterus, above the opening of fallopian tubes.

- Option (1) is incorrect as isthmus is the last and narrow part of the oviduct that links to the uterus.
- Option (2) is incorrect as infundibulum is the part of oviduct which is closer to the ovary.
- Option (3) is incorrect as ampulla is the wider part of the oviduct.

153. The "Ti plasmid" of *Agrobacterium tumefaciens* stands for

(1) Tumor independent plasmid

(2) Tumor inducing plasmid

(3) Temperature independent plasmid

(4) Tumour inhibiting plasmid

Answer (2)

Sol. The correct answer is option (2) as Ti plasmid of *Agrobacterium tumefaciens* is tumor inducing plasmid, containing T-DNA which causes tumor in several dicot plants.

Options (1), (3) and (4) are not correct.

154. Match List I with List II :

	List I		List II
A.	Expiratory capacity	I.	Expiratory reserve volume + Tidal volume + Inspiratory reserve volume
B.	Functional residual capacity	II.	Tidal volume + Expiratory reserve volume
C.	Vital capacity	III.	Tidal volume + Inspiratory reserve volume
D.	Inspiratory capacity	IV.	Expiratory reserve volume + Residual volume

Choose the correct answer from the options given below :

(1) A-III, B-II, C-IV, D-I
(2) A-II, B-I, C-IV, D-III
(3) A-I, B-III, C-II, D-IV
(4) A-II, B-IV, C-I, D-III

Answer (4)

Sol. Expiratory capacity = Tidal volume + Expiratory reserve volume

Functional residual capacity = Expiratory reserve volume + Residual volume

Vital capacity = Expiratory reserve volume + Tidal volume + Inspiratory reserve volume

Inspiratory capacity = Tidal volume + Inspiratory reserve volume

155. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : FSH acts upon ovarian follicles in female and Leydig cells in male.

Reason R : Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

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

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

Answer (3)

Sol. The correct answer is option (3) as FSH is a gonadotropin affects ovarian follicles in females and causes their growth but in males LH affects Leydig cells leading to secretion of androgens.

Growing ovarian follicles secrete estrogen in females while interstitial cells secrete androgen in male human being.

Hence, Assertion is false and Reason is true.

156. Match List I with List II :

	List-I		List-II
A.	Lipase	I.	Peptide bond
B.	Nuclease	II.	Ester bond
C.	Protease	III.	Glycosidic bond
D.	Amylase	IV.	Phosphodiester bond

Choose the correct answer from the options given below :

(1) A-III, B-II, C-I, D-IV
(2) A-II, B-IV, C-I, D-III
(3) A-IV, B-I, C-III, D-II
(4) A-IV, B-II, C-III, D-I

Answer (2)

Sol. The correct answer is option (2) as

A.	Lipase	–	Digests ester bond found in lipids.
B.	Nuclease	–	Helps in digestion of phosphodiester bonds found in nucleic acids.
C.	Protease	–	Helps in digestion of peptide bond found in proteins.
D.	Amylase	–	Digests/breaks the glycosidic bonds found in carbohydrates i.e., digest starch into smaller molecules, ultimately yielding maltose, which in turn is cleaved into two glucose molecules by maltase.

157. Given below are some stages of human evolution.

Arrange them in correct sequence. (Past to Recent)

A. *Homo habilis*
B. *Homo sapiens*
C. *Homo neanderthalensis*
D. *Homo erectus*

Choose the correct sequence of human evolution from the options given below:

(1) B-A-D-C
(2) C-B-D-A
(3) A-D-C-B
(4) D-A-C-B

Answer (3)

Sol. Correct answer is option (3) because the correct sequence of stages of human evolution from past to recent is

Homo habilis → *Homo erectus* → *Homo neanderthalensis* → *Homo sapiens*

158. Which of the following are Autoimmune disorders?

A. Myasthenia gravis
B. Rheumatoid arthritis
C. Gout
D. Muscular dystrophy
E. Systemic Lupus Erythematosus (SLE)

Choose the most appropriate answer from the options given below:

(1) A, B & E only
(2) B, C & E only
(3) C, D & E only
(4) A, B & D only

Answer (1)

Sol. The correct answer is option (1) as Myasthenia gravis, Rheumatoid arthritis and Systemic Lupus Erythematosus (SLE) are autoimmune disorders.

Muscular dystrophy is a genetic disorder which progressively affects the skeletal muscles.

Gout is the inflammation of joints due to deposition of uric acid crystals.

Option (2), (3) and (4) are not the correct answer because all of them are not autoimmune disorders.

159. Match List I with List II :

List I	**List II**
A. Common cold	I. *Plasmodium*
B. Haemozoin	II. Typhoid
C. Widal test	III. Rhinoviruses
D. Allergy	IV. Dust mites

Choose the correct answer from the options given below :

(1) A-I, B-III, C-II, D-IV
(2) A-III, B-I, C-II, D-IV
(3) A-IV, B-II, C-III, D-I
(4) A-II, B-IV, C-III, D-I

Answer (2)

Sol. Correct answer is option (2) because

- Common cold is caused by Rhinoviruses
- Haemozoin is released in blood due to ruptured RBCs after *Plasmodium* infection.
- Widal test is used to confirm the typhoid fever.
- Allergy is caused due to dust mites.

160. Match List I with List II :

	List I		**List II**
A.	Axoneme	I.	Centriole
B.	Cartwheel pattern	II.	Cilia and flagella
C.	Crista	III.	Chromosome
D.	Satellite	IV.	Mitochondria

Choose the correct answer from the options given below :

(1) A-IV, B-II, C-III, D-I

(2) A-II, B-IV, C-I, D-III

(3) A-II, B-I, C-IV, D-III

(4) A-IV, B-III, C-II, D-I

Answer (3)

Sol. • Axoneme is seen in cilia and flagella

• Centriole shows cartwheel appearance

• Crista is found in mitochondria

• Satellite is present in chromosomes

161. Match List I with List II :

	List I		**List II**
A.	Pleurobrachia	I.	Mollusca
B.	Radula	II.	Ctenophora
C.	Stomochord	III.	Osteichthyes
D.	Air bladder	IV.	Hemichordata

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-IV, B-II, C-III, D-I

Answer (1)

Sol. The correct answer is option (1) as

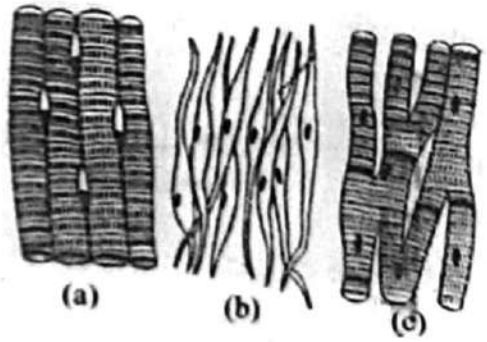
A. Pleurobrachia – is a member of phylum Ctenophora.

B. Radula – is a rasping feeding organ present in phylum Mollusca.

C. Stomochord – Rudimentary structure similar to notochord found in the collar region of members of phylum Hemichordata.

D. Air bladder – is found in Osteichthyes which provides them buoyancy.

162. Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body:



Name of muscle/location

(1) (a) Skeletal – Triceps
(b) Smooth – Stomach
(c) Cardiac – Heart

(2) (a) Skeletal – Biceps
(b) Involuntary – Intestine
(c) Smooth – Heart

(3) (a) Involuntary – Nose tip
(b) Skeletal – Bone
(c) Cardiac – Heart

(4) (a) Smooth – Toes
(b) Skeletal – Legs
(c) Cardiac – Heart

Answer (1)

Sol. The correct answer is option (1) as

Figure (a) represents skeletal muscle fibres which are closely attached to skeletal bones. In a typical muscle such as triceps and biceps, striated muscle fibres are bundled together in a parallel fashion.

Figure (b) represents smooth muscle fibres which are present in the wall of internal organs such as the blood vessels, stomach and intestine.

Figure (c) represents cardiac muscle fibres which are exclusively present in the heart.

163. Match List I with List II :

	List I (Sub Phases of Prophase I)		**List II (Specific Characters)**
A.	Diakinesis	I.	Synaptonemal complex formation
B.	Pachytene	II.	Completion of terminalisation of chiasmata
C.	Zygotene	III.	Chromosomes look like thin threads
D.	Leptotene	IV.	Appearance of recombination nodules

Choose the correct answer from the options given below

(1) A-I, B-II, C-IV, D-III
(2) A-II, B-IV, C-I, D-III
(3) A-IV, B-III, C-II, D-I
(4) A-IV, B-II, C-III, D-I

Answer (2)

Sol. (A) Diakinesis – Completion of terminalisation of chiasmata

(B) Pachytene – Appearance of recombination nodules

(C) Zygotene – Synaptonemal complex formation

(D) Leptotene – Chromosomes look like thin threads

A-II, B-IV, C-I, D-III

164. Match List I with List II :

	List I		**List II**
A.	Down's syndrome	I.	11^{th} chromosome
B.	α-Thalassemia	II.	'X' chromosome
C.	β-Thalassemia	III.	21^{st} chromosome
D.	Klinefelter's syndrome	IV.	16^{th} chromosome

Choose the correct answer from the options given below :

(1) A-II, B-III, C-IV, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-I, C-II, D-III

(4) A-I, B-II, C-III, D-IV

Answer (2)

Sol. Down's syndrome is due to presence of an additional copy of chromosome number 21. Klinefelter's syndrome is caused due to presence of an additional copy of X-chromosome. α-Thalassemia is controlled by two closely linked genes on chromosome 16 of each parent. β-Thalassemia is controlled by a single gene HBB on chromosome 11 of each parent.

165. Which of the following statements is incorrect?

(1) Most commonly used bio-reactors are of stirring type

(2) Bio-reactors are used to produce small scale bacterial cultures

(3) Bio-reactors have an agitator system, an oxygen delivery system and foam control system

(4) A bio-reactor provides optimal growth conditions for achieving the desired product

Answer (2)

Sol. Correct answer is option (2)

The statement (2) is incorrect because bioreactors are used for processing of large volumes (100 – 1000 litres) of culture.

Small volume cultures cannot yield appreciable quantities of products. To produce in large quantities the development of bioreactors is required.

166. Match List I with List II :

	List I		**List II**
A.	*Pterophyllum*	I.	Hag fish
B.	*Myxine*	II.	Saw fish
C.	*Pristis*	III.	Angel fish
D.	*Exocoetus*	IV.	Flying fish

Choose the correct answer from the options given below :

(1) A-III, B-I, C-II, D-IV

(2) A-IV, B-I, C-II, D-III

(3) A-III, B-II, C-I, D-IV

(4) A-II, B-I, C-III, D-IV

Answer (1)

Sol. The correct option is option no. (1) as

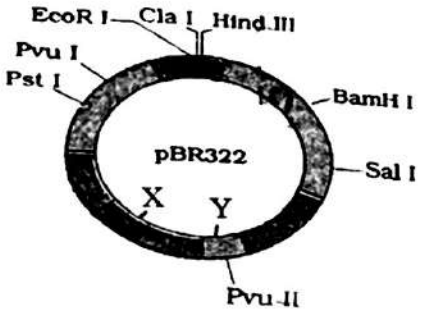
Pterophyllum is the scientific name for Angel fish.

Myxine is the scientific name for Hag fish.

Pristis is the scientific name for Saw fish.

Exocoetus is the scientific name for Flying fish.

167. The following diagram showing restriction sites in *E. coli* cloning vector pBR322. Find the role of '*X*' and '*Y*' genes :



(1) The gene '*X*' is responsible for controlling the copy number of the linked DNA and '*Y*' for protein involved in the replication of Plasmid.

(2) The gene '*X*' is for protein involved in replication of Plasmid and '*Y*' for resistance to antibiotics.

(3) Gene '*X*' is responsible for recognitions sites and '*Y*' is responsible for antibiotic resistance.

(4) The gene '*X*' is responsible for resistance to antibiotics and '*Y*' for protein involved in the replication of Plasmid.

Answer (1)

Sol. Correct answer is option (1), because

'*X*' in the given diagram is *ori* while '*Y*' is *rop*.

'*X*' which is *ori* is responsible for controlling the copy number of the linked DNA and '*Y*' which is *rop* codes for protein involved in the replication of plasmid.

Options (2), (3) and (4) are incorrect as '*X*' and '*Y*' are not related to these functions.

168. Given below are two statements:

Statement I: The presence or absence of hymen is not a reliable indicator of virginity.

Statement II: The hymen is torn during the first coitus only.

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

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Answer (2)

Sol. The correct answer is option no. (2) because the presence or absence of hymen is not a reliable indicator of virginity because hymen can also be broken by a sudden jolt, insertion of a vaginal tampon, active participation in some sports and in some women the hymen persists even after coitus.

169. Consider the following statements :

A. Annelids are true coelomates

B. Poriferans are pseudocoelomates

C. Aschelminthes are acoelomates

D. Platyhelminthes are pseudocoelomates

Choose the correct answer from the options given below :

(1) A only (2) C only

(3) D only (4) B only

Answer (1)

Sol. The correct answer is option no. (1), because annelids are true coelomate animals. Options (2), (3) and (4) are incorrect because poriferans are acoelomates, aschelminths are pseudocoelomates and platyhelminthes are acoelomates.

170. Given below are two statements :

Statement I : In the nephron, the descending limb of loop of Henle is impermeable to water and permeable to electrolytes.

Statement II : The proximal convoluted tubule is lined by simple columnar brush border epithelium and increases the surface area for reabsorption.

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

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Answer (1)

Sol. Correct answer is option (1) because

Statement I is false as the descending limb of loop of Henle is permeable to water and almost impermeable to electrolytes.

Statement II is false as proximal convoluted tubule is lined by simple cuboidal brush border epithelium which increases the surface area for reabsorption.

171. Following are the stages of cell division :

A. Gap 2 phase B. Cytokinesis

C. Synthesis phase D. Karyokinesis

E. Gap 1 phase

Choose the correct sequence of stages from the options given below :

(1) E-B-D-A-C (2) B-D-E-A-C

(3) E-C-A-D-B (4) C-E-D-A-B

Answer (3)

Sol. The correct sequence of stages of cell division is

$$\underset{(E)}{\text{Gap 1 phase}} \rightarrow \underset{(C)}{\text{Synthesis phase}} \rightarrow \underset{(A)}{\text{Gap 2 phase}} \rightarrow \underset{(D)}{\text{Karyokinesis}} \rightarrow \underset{(B)}{\text{Cytokinesis}}$$

The correct sequence will be $\rightarrow E \rightarrow C \rightarrow A \rightarrow D \rightarrow B$

172. In both sexes of cockroach, a pair of jointed filamentous structures called anal cerci are present on

(1) 10^{th} segment
(2) 8^{th} and 9^{th} segment
(3) 11^{th} segment
(4) 5^{th} segment

Answer (1)

Sol. Correct answer is option (1), because in both sexes of cockroach, 10^{th} segment bears a pair of jointed filamentous structures called anal cerci.

Options (2), (3) and (4) are incorrect because 5^{th}, 8^{th} and 9^{th} segments do not bear such structures. In adult cockroaches only 10^{th} segments are present in abdomen. 11^{th} abdominal segment is absent.

173. Match List I with List II :

	List I		List II
A.	Fibrous joints	I.	Adjacent vertebrae, limited movement
B.	Cartilaginous joints	II.	Humerus and Pectoral girdle, rotational movement
C.	Hinge joints	III.	Skull, don't allow any movement
D.	Ball and socket joints	IV.	Knee, help in locomotion

Choose the correct answer from the options given below :

(1) A-I, B-III, C-II, D-IV
(2) A-II, B-III, C-I, D-IV
(3) A-III, B-I, C-IV, D-II
(4) A-IV, B-II, C-III, D-I

Answer (3)

Sol. The correct answer is option no. (3) as

- Fibrous joints do not allow any movement. This type of joint is shown by the flat skull bones which fuse end-to-end with the help of dense fibrous connective tissues in the form of sutures.
- Cartilaginous joint is present between the adjacent vertebrae in the vertebral column and this permits limited movements.
- Hinge joint is a type of synovial joint present in knee, help in locomotion
- Ball and socket joint is also a type of synovial joint present between humerus and pectoral girdle and allows rotational movement.

174. Which of the following is not a steroid hormone?

(1) Testosterone
(2) Progesterone
(3) Glucagon
(4) Cortisol

Answer (3)

Sol. The correct answer is option (3) as glucagon is a proteinaceous hormone secreted from pancreas.

Options (1), (2) and (4) are not correct as they are steroid in nature.

175. Following are the stages of pathway for conduction of an action potential through the heart

A. AV bundle
B. Purkinje fibres
C. AV node
D. Bundle branches
E. SA node

Choose the correct sequence of pathway from the options given below

(1) A-E-C-B-D
(2) B-D-E-C-A
(3) E-A-D-B-C
(4) E-C-A-D-B

Answer (4)

Sol. Correct answer is option (4) because the correct pathway of conduction of action potential is

SA $\rightarrow$ AV node $\rightarrow$ AV bundle $\rightarrow$ Bundle branches $\rightarrow$ Purkinje fibres

176. Match **List I** with **List II**

	List I		**List II**
A.	Non-medicated IUD	I.	Multiload 375
B.	Copper releasing IUD	II.	Progestogens
C.	Hormone releasing IUD	III.	Lippes loop
D.	Implants	IV.	LNG-20

Choose the correct answer from the option given below:

(1) A-I, B-III, C-IV, D-II

(2) A-IV, B-I, C-II, D-III

(3) A-III, B-I, C-IV, D-II

(4) A-III, B-I, C-II, D-IV

Answer (3)

Sol. Correct answer is option (3) because

- Lippes loop is a non-medicated IUD.
- Multiload 375 is a copper releasing IUD.
- LNG -20 is a hormone releasing IUD.
- Progestogens are used as implants.

177. Which of the following is not a natural/traditional contraceptive method?

(1) Periodic abstinence

(2) Lactational amenorrhea

(3) Vaults

(4) Coitus interruptus

Answer (3)

Sol. The correct answer is option (3) as

Vault is a barrier method of contraception which is made of rubber that is inserted into the female reproductive tract to cover the cervix during the coitus.

- Option (1) is incorrect as periodic abstinence is also a natural method of contraception in which couples avoid coitus during the fertile period.
- Option (2) is incorrect as lactational amenorrhea is also a natural method of contraception which is based on the fact that ovulation and therefore the cycle do not occur during the period of intense lactational following parturition.
- Option (4) is incorrect as coitus interruptus is a natural method of contraception in which male partner withdraws his penis from the vagina just before ejaculation so as to avoid insemination.

178. Which one is the correct product of DNA dependent RNA polymerase to the given template?

3'TACATGGCAAATATCCATTCA5'

(1) 5'AUGUAAAGUUUAUAGGUAAGU3'

(2) 5'AUGUACCGUUUAUAGGGAAGU3'

(3) 5'ATGTACCGTTTATAGGTAAGT3'

(4) 5'AUGUACCGUUUAUAGGUAAGU3'

Answer (4)

Sol. Template DNA is :

3'TACATGGCAAATATCCATTCA5'

5'AUGUACCGUUUAUAGGUAAGU3' m-RNA

179. Which one of the following factors will not affect the Hardy-Weinberg equilibrium?

(1) Genetic drift

(2) Gene migration

(3) Constant gene pool

(4) Genetic recombination

Answer (3)

Sol. The correct answer is option (3) as a constant gene pool will not disturb the Hardy-Weinberg equilibrium. Option (1), (2) & (4) will affect the equilibrium leading to evolution.

180. Match List I with List II :

	List I		**List II**
A.	Cocaine	I.	Effective sedative in surgery
B.	Heroin	II.	*Cannabis sativa*
C.	Morphine	III.	*Erythroxylum*
D.	Marijuana	IV.	*Papaver somniferum*

Choose the correct answer from the options given below:

(1) A-I, B-III, C-II, D-IV

(2) A-II, B-I, C-III, D-IV

(3) A-III, B-IV, C-I, D-II

(4) A-IV, B-III, C-I, D-II

Answer (3)

Sol. The correct option is (3) as

A. Cocaine – Obtained from plant *Erythroxylum coca*, stimulating action on CNS.

B. Heroin – Formed by the acetylation of morphine which is obtained from plant *Papaver somniferum*.

C. Morphine – Obtained from *Papaver somniferum*, is an effective sedative in surgery.

D. Marijuana – Obtained from *Cannabis sativa*, produces hallucinogenic effect and affects cardiovascular system of the body.

181. Match List I with List II :

	List I		**List II**
A.	Typhoid	I.	Fungus
B.	Leishmaniasis	II.	Nematode
C.	Ringworm	III.	Protozoa
D.	Filariasis	IV.	Bacteria

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-I, D-II

(2) A-III, B-I, C-IV, D-II

(3) A-II, B-IV, C-III, D-I

(4) A-I, B-III, C-II, D-IV

Answer (1)

Sol. The correct answer is option (1) as

Typhoid – Caused by *Salmonella typhimurium* (Bacteria)

Leishmaniasis – Caused by protozoan *i.e., Leishmania donovani*

Ringworm – Caused by fungi belonging to the genera *Microsporum, Trichophyton* and *Epidermophyton*

Filariasis – Caused by *Wuchereria bancrofti* and *Wuchereria malayi* (Nematode)

182. Match **List I** with **List II** :

	List I		**List II**
A.	α –I antitrypsin	I.	Cotton bollworm
B.	Cry IAb	II.	ADA deficiency
C.	Cry IAc	III.	Emphysema
D	Enzyme replacement therapy	IV	Corn borer

Choose the correct answer form the options given below:

(1) A-III, B-I, C-II, D-IV

(2) A-III, B-IV, C-I, D-II

(3) A-II, B-IV, C-I, D-III

(4) A-II, B-I, C-IV, D-III

Answer (2)

Sol. The correct answer is option (2) as

α– I antitrypsin $\rightarrow$ Is used for treatment of Emphysema

Cry I Ab gene $\rightarrow$ Controls corn borer

Cry I Ac gene $\rightarrow$ Controls cotton bollworms

Enzyme replacement therapy $\rightarrow$ Can be used as treatment option in ADA deficiency.

183. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby.

Reason R : Colostrum contains several antibodies absolutely essential to develop resistance for the new born baby.

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

(1) Both A and R are correct but R is NOT the correct explanation of A

(2) A is correct but R is not correct

(3) A is not correct but R is correct

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

Answer (4)

Sol. Correct answer is option (4)

Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby as colostrum contains several antibodies absolutely essential to develop resistance for the new born baby.

184. The flippers of the Penguins and Dolphins are the example of the

(1) Natural selection

(2) Convergent evolution

(3) Divergent evolution

(4) Adaptive radiation

Answer (2)

Sol. The correct answer is option (2), because the flippers of the Penguins and Dolphins perform similar function but they are not anatomically similar structures. This is example of analogous structures.

- Option (1) is incorrect as natural selection is a key mechanism of evolution.
- Option (3) is incorrect as divergent evolution results in the formation of homologous structures.
- Option (4) is incorrect as adaptive radiation is the process of evolution of different species in a given geographical area starting from a point and literally radiating to the other areas of geography.

185. Which of the following factors are favourable for the formation of oxyhaemoglobin in alveoli?

(1) High pO_2 and Lesser H^+ concentration

(2) Low pCO_2 and High H^+ concentration

(3) Low pCO_2 and High temperature

(4) High pO_2 and High pCO_2

Answer (1)

Sol. The correct answer is option (1) as

Conditions favourable for formation of oxyhaemoglobin in alveoli are high pO_2, less H^+ concentration low pCO_2 and low temperature.

Option (2), (3) and (4) are not correct as they do not favour the formation of oxyhaemoglobin.

186. Match List I with List II:

	List I		**List II**
A.	Unicellular glandular epithelium	I.	Salivary glands
B.	Compound epithelium	II.	Pancreas
C.	Multicellular glandular epithelium	III.	Goblet cells of alimentary canal
D.	Endocrine glandular epithelium	IV.	Moist surface of buccal cavity

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-I, D-II

(2) A-III, B-IV, C-I, D-II

(3) A-II, B-I, C-IV, D-III

(4) A-II, B-I, C-III, D-IV

Answer (2)

Sol. The correct answer is option no. (2) as

A. Unicellular glandular epithelium — (III) Goblet cells of alimentary canal

B. Compound epithelium — (IV) Lines moist surface of buccal cavity

C. Multicellular glandular epithelium — (I) Salivary glands

D. Endocrine glandular epithelium — (II) Pancreas

187. Choose the correct statement given below regarding juxta medullary nephron.

(1) Renal corpuscle of juxta medullary nephron lies in the outer portion of the renal medulla.

(2) Loop of Henle of juxta medullary nephron runs deep into medulla.

(3) Juxta medullary nephrons outnumber the cortical nephrons.

(4) Juxta medullary nephrons are located in the columns of Bertini.

Answer (2)

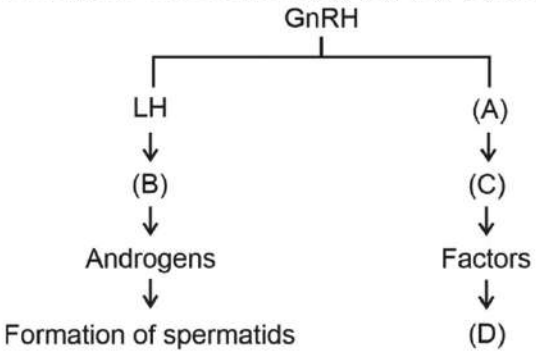
Sol. The correct answer is option no, (2) because the length of loop of Henle of juxta medullary nephron is longer than the length of loop of Henle of cortical nephron and runs deep into medulla.

Option (1) is incorrect because renal corpuscle of juxta medullary nephron lies in inner cortical region.

Option (3) is incorrect as juxta medullary nephrons are lesser in number than cortical nephrons.

Option (4) is incorrect as juxta medullary nephron are not present in columns of Bertini.

188. Identify the correct option (A), (B), (C), (D) with respect to spermatogenesis.



(1) ICSH, Interstitial cells, Leydig cells, spermiogenesis.

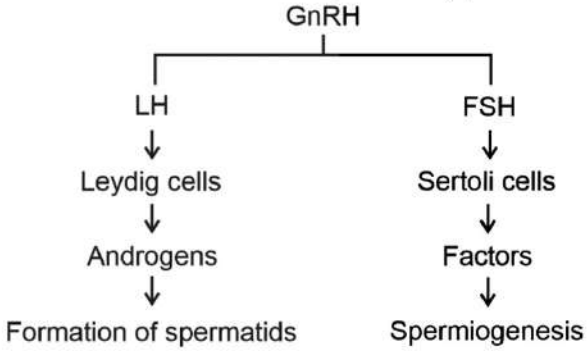
(2) FSH, Sertoli cells, Leydig cells, spermatogenesis.

(3) ICSH, Leydig cells, Sertoli cells, spermatogenesis.

(4) FSH, Leydig cells, Sertoli cells, spermiogenesis.

Answer (4)

Sol. The correct answer is option no. (4) as



(A) is FSH which is a pituitary hormone.

(B) is Leydig cells which are found in the interstitial space outside of the seminiferous tubules.

(C) is Sertoli cells are found inside the seminiferous tubules.

(D) is Spermiogenesis which is a process that helps in transformation of spermatids into spermatozoa.

189. Match List I with List II :

	List I		**List II**
A.	P wave	I.	Heart muscles are electrically silent.
B.	QRS complex	II.	Depolarisation of ventricles.
C.	T wave	III.	Depolarisation of atria.
D.	T-P gap	IV.	Repolarisation of ventricles.

Choose the correct answer from the options given below :

(1) A-III, B-II, C-IV, D-I

(2) A-II, B-III, C-I, D-IV

(3) A-IV, B-II, C-I, D-III

(4) A-I, B-III, C-IV, D-II

Answer (1)

Sol. The correct answer is option no. (1) as

A.	P wave	-	III.	Depolarisation of atria.
B.	QRS complex	-	II.	Depolarisation of ventricles.
C.	T wave	-	IV.	Repolarisation of ventricles.
D.	T-P gap	-	I.	Heart muscles are electrically silent.

190. Given below are two statements :

Statement I : Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.

Statement II : Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.

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

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

Answer (4)

Sol. The correct answer is option no. (4) as both statements I and II are correct.

In humans, the bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.

Both bone-marrow and thymus provide micro-environments for the development and maturation of T-lymphocytes.

Options (1), (2) and (3) are incorrect.

191. Given below are two statements:

Statement I: Gause's competitive exclusion principle states that two closely related species competing for different resources cannot exist indefinitely.

Statement II: According to Gause's principle, during competition, the inferior will be eliminated. This may be true if resources are limiting.

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

(1) Both Statement I and Statement II are false.

(2) Statement I is true but Statement II is false.

(3) Statement I is false but Statement II is true.

(4) Both Statement I and Statement II are true.

Answer (3)

Sol. Gause's competitive exclusion principle states that two closely related species competing for the same resources cannot exist indefinitely and the competitively inferior one will be eliminated eventually. This may be true if resources are limiting.

192. Match List I with List II :

	List I		List II
A.	Exophthalmic goiter	I.	Excess secretion of cortisol, moon face & hypergylcemia.
B.	Acromegaly	II.	Hypo-secretion of thyroid hormone and stunted growth.
C.	Cushing's syndrome	III.	Hyper secretion of thyroid hormone & protruding eye balls.
D.	Cretinism	IV.	Excessive secretion of growth hormone.

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-III, B-IV, C-I, D-II

(4) A-I, B-III, C-II, D-IV

Answer (3)

Sol. The correct answer is option no. (3) as

(A)	Exophthalmic goiter	(III)	Hyper secretion of thyroid hormone and characterized by protruding eye balls
(B)	Acromegaly	(IV)	Excessive secretion of growth hormone
(C)	Cushing's syndrome	(I)	Excess secretion of cortisol, moon face and hyperglycaemia
(D)	Cretinism	(II)	Hypo-secretion of thyroid hormone and characterized by stunted growth

193. Match List I with List II related to digestive system of cockroach.

	List I		List II
A.	The structures used for storing of food	I.	Gizzard
B.	Ring of 6-8 blind tubules at junction of foregut and midgut.	II.	Gastric Caeca
C.	Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut.	III.	Malpighian tubules
D.	The structures used for grinding the food.	IV.	Crop

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV

(2) A-IV, B-III, C-II, D-I

(3) A-III, B-II, C-IV, D-I

(4) A-IV, B-II, C-III, D-I

Answer (4)

Sol. The correct answer is option no. (4) as

The structure used for griding the food particles	–	Gizzard
The structure used for storing of food	–	Crop
Ring of 6-8 blind tubules at junction of foregut and midgut which assists in secretion of digestive juices	–	Gastric Caeca
Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut which assists in elimination of nitrogenous wastes	–	Malpighian tubules

194. As per ABO blood grouping system, the blood group of father is B^+, mother is A^+ and child is O^+. Their respective genotype can be

A. $I^Bi/I^Ai/ii$

B. $I^BI^B/I^AI^A/ii$

C. $I^AI^B/iI^A/I^Bi$

D. $I^Ai/I^Bi/I^Ai$

E. $iI^B/iI^A/I^AI^B$

Choose the most appropriate answer from the options given below :

(1) B only

(2) C & B only

(3) D & E only

(4) A only

Answer (4)

Sol. Genotype of father with blood group $B^+ = I^Bi/iI^B$

Genotype of mother with blood group $A^+ = I^Ai/iI^A$

Genotype of child with blood group $O^+ = ii$

Hence only 'A' is correct.

195. Match List I with List II:

	List I		**List II**
A.	RNA polymerase III	I.	snRNPs
B.	Termination of transcription	II.	Promotor
C.	Splicing of Exons	III.	Rho factor
D.	TATA box	IV.	SnRNAs, tRNA

Choose the correct answer from the options given below :

(1) A-III, B-II, C-IV, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-III, C-I, D-II

(4) A-II, B-IV, C-I, D-III

Answer (3)

Sol.
- In eukaryotes, RNA polymerase III codes for snRNAs, tRNA and 5s rRNA.
- Splicing of exons is performed by snRNPs.
- TATA box is present in promoter region of transcription unit.
- Rho factor is responsible for termination of transcription.

196. Match List I with List II:

	List I		**List II**
A.	Mesozoic Era	I.	Lower invertebrates
B.	Proterozoic Era	II.	Fish & Amphibia
C.	Cenozoic Era	III.	Birds & Reptiles
D.	Paleozoic Era	IV.	Mammals

Choose the correct answer from the options given below :

(1) A-III, B-I, C-II, D-IV

(2) A-I, B-II, C-IV, D-III

(3) A-III, B-I, C-IV, D-II

(4) A-II, B-I, C-III, D-IV

Answer (3)

Sol. The correct answer is option no. (3)

(A)	Mesozoic Era	–	(III)	Birds & Reptiles
(B)	Proterozoic Era	–	(I)	Lower invertebrates
(C)	Cenozoic Era	–	(IV)	Mammals
(D)	Paleozoic Era	–	(II)	Fish & Amphibia

197. Given below are two statements:

Statement I: The cerebral hemispheres are connected by nerve tract known as corpus callosum.

Statement II: The brain stem consists of the medulla oblongata, pons and cerebrum.

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

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

Answer (2)

Sol. The correct answer is option (2) as statement I is correct but statement II is incorrect.

In human brain, a deep cleft divides the cerebrum longitudinally into two halves, which are termed as the left and right cerebral hemispheres. The cerebral hemispheres are connected by a tract of nerve fibres called corpus callosum.

Three major regions make up the brain stem *i.e.* mid brain, pons and medulla oblongata.

Cerebrum is a part of forebrain which does not form brain stem.

Options (1), (3) and (4) are incorrect.

198. Regarding catalytic cycle of an enzyme action, select the correct sequential steps :

A. Substrate enzyme complex formation.

B. Free enzyme ready to bind with another substrate.

C. Release of products.

D. Chemical bonds of the substrate broken.

E. Substrate binding to active site.

Choose the correct answer from the options given below :

(1) A, E, B, D, C

(2) B, A, C, D, E

(3) E, D, C, B, A

(4) E, A, D, C, B

Answer (4)

Sol. The correct answer is option (4) which is E, A, D, C, B.

The catalytic cycle of an enzyme action can be described in the following steps.

(1) The binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate.

(2) The active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme-product complex is formed.

(3) The enzyme releases the products of the reaction and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle once again.

(4) First, the substrate binds to the active site of the enzyme, fitting into the active site.

Options (1), (2) and (3) are incorrect as the steps mentioned are in the wrong sequence.

199. Given below are two statements:

Statement I: Mitochondria and chloroplasts both double membranes bound organelles.

Statement II: Inner membrane of mitochondria is relatively less permeable, as compared chloroplast.

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

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

Answer (2)

Sol. Both mitochondria and chloroplasts are double membrane bound cell organelles.

Transport of ions occurs across the inner membrane of mitochondria. The inner membrane of chloroplast is impermeable to ions and metabolites. Therefore, it is said that inner membrane of mitochondria is relatively more permeable to that of chloroplast.

200. The following are the statements about non-chordates:

A. Pharynx is perforated by gill slits.

B. Notochord is absent.

C. Central nervous system is dorsal.

D. Heart is dorsal if present.

E. Post anal tail is absent.

Choose the most appropriate answer from the options given below:

(1) A, B & D only

(2) B, D & E only

(3) B, C & D only

(4) A & C only

Answer (2)

Sol. The correct answer is option no. (2) as the features of non-chordates among the given statements are:

B. Notochord is absent.

D. Heart is dorsal if present.

E. Post anal tail is absent.

Statements A and C are features of chordates.

Hence, option (2) is correct and options (1), (3) and (4) are incorrect.