SUBJECT : BIOLOGY

91. Which of the following is the unit of productivity of an Ecosystem ?

(1) (KCal m^{-2}) yr^{-1} (2) gm^{-2}

(3) KCal m^{-2} (4) KCal m^{-3}

Ans. (1)

Sol. Unit of productivity of an ecosystem $\rightarrow$ (KCal m^{-2}) yr^{-1}

92. The first menstruation is called

(1) Ovulation (2) Menopause (3) Menarche (4) Diapause

Ans. (3)

Sol. The first menstruation begins at puberty and is called menarche.

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

Assertion (A) : All vertebrates are chordates but all chordates are not vertebrate.

Reason (R) : The members of subphylum vertebrata posess notochord during the embryonic period, the notochord is replaced by a cartilaginous or bony vertebral column in adults.

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

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

(1) **A** is false but **R** is true

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

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

(4) **A** is true but **R** is false

Ans. (2)

Sol. The members of subphylum Vertebrata possess notochord during the embryonic period. The notochord is replaced by a cartilaginous or bony vertebral column in the adult. Thus all vertebrates are chordates but all chordates are not vertebrates

94. Genes R and Y follow independent assortment. If RRYY produce round yellow seeds and rryy produce wrinkled green seeds, what will be the phenotypic ratio of the F_2 generation ?

(1) Phenotypic ratio - 9 : 7
(2) Phenotypic ratio - 1 : 2 : 1
(3) Phenotypic ratio - 3 : 1
(4) Phenotypic ratio - 9 : 3 : 3 : 1

Ans. (4)

Sol. Phenotypic ratio of F_2 generation of dihybrid cross $\rightarrow$ 9 : 3 : 3 : 1

95. Given below are two statements :

Statement-I : The DNA fragements extracted from gel electrophoresis can be used in construction of recombinant DNA.

Statement-II: Smaller size DNA fragments are observed near anode while larger fragments are found near the wells in an agarose gel.

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

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

Ans. (2)

Sol. **Statement-I :** By gel electrophoresis, foreign DNA containing desired gene is extracted by elution which is combined with vector to construct recombinant DNA.

Statement-II : DNA is negatively charged molecule hence, move towards anode.The DNA fragments separate (resolve) according to their size through sieving effect provided by the agarose gel. Hence, the smaller the fragment size, the farther it moves.

96. What is the main function of the spindle fibres during mitosis ?

(1) To regulate cell growth
(2) To separate the chromosomes
(3) To synthesize new DNA
(4) To repair damaged DNA

Ans. (2)

Sol. Spindle fibres attach to the kinetochore at centromere to separate the chromosomes during cell division

97. How many meiotic and mitotic divisions need to occur for the development of a mature female gametophyte from the megaspore mother cell in an angiosperms plant ?

(1) No Meiosis and 2 Mitosis
(2) 2 Meiosis and 3 Mitosis
(3) 1 Meiosis and 2 Mitosis
(4) 1 Meiosis and 3 Mitosis

Ans. (4)

Sol.

Megaspore mother cell (2n)

↓

Meiosis

↓

4 Megaspores

↓

Three of the megaspores degenerate and only one megaspore (n) remains functional

↓

Undergo three mitotic divisions to form 7-celled and 8-nucleated female gametophyte (embryo sac)

98. Identify the statement that is **NOT** correct :

(1) Constatnt region of heavy and light chains are located at C-terminus of antibody are located at C-terminusof antibody molecules.

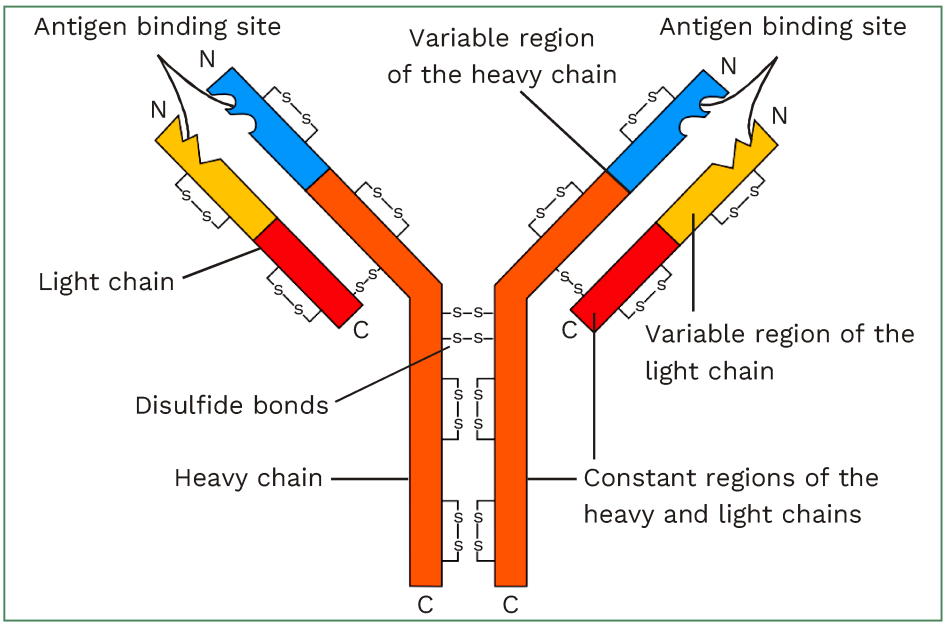
(2) Each antibody has two light and two heavy chains.

(3) The heavy and light chains are held together by disulfide bonds.

(4) Antigen binding site is located at C-terminal region of antibody molecules.

Ans. (4)

Sol.



Constant region of heavy and light chains are located at C-terminus of antibody while variable region of heavy and light chains are located at N-terminus of antibody.

99. Consider the following :

A. The reductive divisions for the human female gametogenesis starts earlier than that of the male gametogenesis.

B. The gap between the first meiotic division and the second meiotic division is much shorter for males compared to females.

C. The first polar body is associated with the formation of the primary oocyte.

D. Luteinizing Hormone (LH) surge leads to disintegration of the endometrium and onset of menstrual bleeding.

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

(1) B and C are true
(2) A and B are true
(3) A and C are true
(4) B and D are true

Ans. (2)

Sol. A. The reductive division for the human female gametogenesis (Oogenesis)starts during fetal life while that of the male gametogenesis (Spermatogenesis) start after puberty.

B. During spermatogenesis continous meiosis while during oogenesis interrupted meiosis take place.

C. The first polar body is associated with the formation of the secondary oocyte.

D. LH surge leads to ovulation while disintegration of the endometrium occur due to low level of progesterone which marks begining of new cycle.

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

Assertion (A) : Cells of the tapetum possess dense cytoplam and generally have more than one nucleus.

Reason (R) : Presence of more than one nucleus in the tapetum increases the efficiency of nourishing the developing microspore mother cells.

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

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

Ans. (2)

Sol. Both **A** and **R** are true and **R** is the correct explanation of A

101. The blue and white selectable markers have been developed which differentiate recombinatnt colonies from non-recombinant colonies on the basisi of their ability to produce colour in the presence of a chromogenic substrate.

Given below are two statements about this method :

Statement-I : The blue coloured colonies have DNA insert in the plamsid and they are identified as recombinant colonies.

Statement-II : The colonies without blue colour have DNa insewrt in the plasmid and are identified as recombinant colonies.

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

(1) Statement I is incorrect but statement II is correct

(2) Both statement I and statement II are correct

(3) Both statement I and statement II are incorrect

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

Ans. (1)

Sol. The presence of a chromogenic substrate gives blue coloured colonies if the plasmid in the bacteria does not have an insert. Presence of insert results into insertional inactivation of the β-galactosidase gene and the colonies do not produce any colour, these are identified as recombinant colonies.

102. In bryophytes, the gemmae help in which one of the following ?

(1) Gaseous exchange

(2) Sexual reproduction

(3) Asexual reproduction

(4) Nutrient absorption

Ans. (3)

Sol. Gemmae are green, multicellular asexual buds for the means of asexual reproduction in bryophytes.

103. Match **List -I** with **List -II** :

List-I	List-II
A. Adenosine	I. Nitrogen base
B. Adenylic acid	II. Nucleotide
C. Adenine	III. Nucleoside
D. Alanine	IV. Amino acid

Choose the option with all **correct** matches.

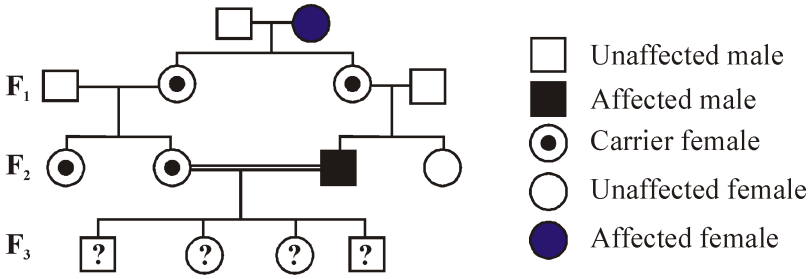
(1) A-II, B-III, C-I, D-IV (2) A-III, B-IV, C-II, D-I

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

Ans. (4)

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

104. With the help of given pedigree. Find out the probability for the birth of a child having no disease and being a carrier (has the disease mutation in one allele of the gene) in F_3 generation :



(1) Zero (2) 1/4 (3) 1/2 (4) 1/8

Ans. (2)

Sol. According to the question the pedigree is of x-linked recessive disorder.

In F_3 generation Zygote combination are following :

♀ \ ♂	X'	Y
X'	X'X'	X'Y
X	X'X	XY

According to the question the probability of child having no disease and being carrier is 1/4.

105. Consider the following statements regarding function of adernal medullary horomens :
A, In causes pupilary constriction
B. It is a hyperglycemic hormome
C. It causes piloerection
D. It increases strength of heart contraction
Choose the **correct** answer from the options given below :
(1) D only (2) C and D Only (3) B, C and D Only (4) A,C and D Only

Ans. **(3)**

Sol. The adrenal medulla secretes epinephrine and norepinephrine. These hormones increase alertness, pupilary **dilation**, piloerection, sweating, heart beat, strength of heart contraction, rate of respiration, glycogenolysis, lipolysis, proteolysis.

106. Which of the following is an example of a zygomorphic flower ?
(1) Chilli (2) Petunia (3) Datura (4) Pea

Ans. **(4)**

Sol. Zygomorphic flower (flower which can be divided into two halves by only one particular verticle plane): Pea

107. Who proposed that the genetic code for amino acids should be made up of three nucleotides?
(1) Franklin Stahl (2) George Gammow
(3) Francis Crick (4) Jacque monad

Ans. **(2)**

Sol. George Gammow

108. Given below are two statements about this method :
Statement-I : In ecosystem, there is unidirectional flow of energy of sun from producers to consumers.
Statement-II : Ecosystems are exempted from 2^{nd} law of thermodynamics.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Statement I is incorrect but statement II is correct
(2) Both statement I and statement II are correct
(3) Both statement I and statement II are incorrect
(4) Statement I is correct but statement II is incorrect

Ans. **(4)**

Sol. Statement I is correct but statement II is incorrect
(Ecosystem follow both 1^{st} and 2^{nd} law of thermodynamics)

109. Sweet potato and potato represent a certain type of evolution. Select the correct combination of terms to explain the evolution.

(1) Analogy, divergent
(2) Analogy, convergent
(3) Homology, divergent
(4) Homology, convergent

Ans. (2)

Sol. Sweet potato (root modification) and potato (stem modification) are not anatomically similar structures though they perform similar functions, such structures show analogy. Analogy is a result of convergent evolution - different structures evolving for the same function and hence having similarity

110. All living members of the class Cyclostomata are :

(1) Ectoparasite
(2) Free living
(3) Endoparasite
(4) Symbiotic

Ans. (1)

Sol. All living members of the class Cyclostomata are ectoparasites on some fishes.

111. Histones are enriched with

(1) Phenylalanine and Arginine
(2) Lysine and Arginine
(3) Lecucine and Lysine
(4) Phenylalanine and Leucine

Ans. (2)

Sol. Histones are enriched with Lysine and Arginine

112. Which one of the following equations represents the Verhulst-Pearl Logistic Growth of population?

(1) $\frac{dN}{dt} = N\left(\frac{r-K}{K}\right)$
(2) $\frac{dN}{dt} = r\left(\frac{K-N}{K}\right)$
(3) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
(4) $\frac{dN}{dt} = rN\left(\frac{N-K}{N}\right)$

Ans. (3)

Sol. $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ equation represents logistic growth curve of population .

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

Assertion (A) : The primary function of the Golgi apparatus is to package the materials made by the endoplasmic reticulum and deliver it to intracellular targets and outside the cell.

Reason (R): Vesicles containing materials made by the endoplasmic reticulum fuse with The cis face of the Golgi apparatus, and they are modified and released from the trans face of the Golgi apparatus.

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

(1) A is false but R is true

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

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

(4) A is true but R is false

Ans. (2)

Sol. Both A and R are true and R is the correct explanation of A

114. Which of the following statements about RuBisCO is true?

(1) It catalyzes the carboxylation of RuBP.

(2) It is active only in the dark.

(3) It has higher affinity for oxygen than carbon dioxide.

(4) It is an enzyme involved in the photolysis of water

Ans. (1)

Sol. RuBisCO catalyzes the carboxylation of RuBP.

115. Match List I with List II :

List-I	**List-II**
A. Progesterone	I. Pars intermedia
B. Relaxin	II. Ovary
C. Melanocyte stimulating hormone	III. Adrenal Medulla
D. Catecholamines	IV. Corpus luteum

Choose the correct answer from the options given below

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

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

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

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

Ans. (2)

116. The protein portion of an enzyme is called :

(1) Prosthetic group (2) Cofactor

(3) Coenzyme (4) Apoenzyme

Ans. (4)

Sol. The protein portion of an enzymes is called the apoenzyme.

117. Which of the following enzyme(s) are **NOT** essential for gene cloning?

A. Restriction enzymes

B. DNA ligase

C. DNA mutase

D. DNA recombinase

E. DNA polymerase

Choose the correct answer from the options given below ?

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

Ans. (2)

Sol. A. Restriction endonuclease - Cutting of DNA on specific recognition site.

B. DNA ligase - Joining of cleaved DNA fragments.

C. DNA mutase- Crucial for DNA repair and prevent mutation.

D. DNA recombinase - Recombinant nodule formation during crossing over.

E. DNA polymerase - DNA replication during PCR.

118. Which of the following type of immunity is present at the time of birth and is a nonspecific type of defence in the human body?

(1) Humoral Immunity (h)

(2) Acquired Immunity

(3) Innate Immunity

(4) Cell-mediated Immunity

Ans. (3)

Sol. Innate immunity is non-specific type of defence, that is present at the time of birth.

119. Which factor is important for termination of transcription?

(1) γ (gamma) (2) α (alpha) (3) σ (sigma) (4) ρ (rho)

Ans. (4)

Sol. In termination of transcription ρ (rho) factor is involved.

120. Which of the following hormones released from the pituitary is actually synthesized in the hypothalamus?

(1) Adenocorticotrophic hormone (ACTH)

(2) Luteinizing hormone (LH)

(3) Anti-diuretic hormone (ADH)

(4) Follicle-stimulating hormone (FSII)

Ans. (3)

Sol. Hypothalamus synthesize two hormones; Oxytocin and Vasopressin/ Anti-diuretic hormone (ADH), which are stored and released by posterior pituitary

121. Which of the following microbes is **NOT** involved in the preparation of household products?

A. Aspergillus niger

B. *Lactobacillus*

C. *Trichoderma polysporum*

D. *Saccharomyces* cerevisiae

E. *Propionibacterium sharmanii*

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

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

Ans. (3)

Sol. A and C only

A. Aspergillus niger $\rightarrow$ Produce citric acid (Chemical)

B. *Lactobacillus* $\rightarrow$ Involved in making a curd

C. *Trichoderma polysporum* $\rightarrow$ Produce cyclosporin a that is used as an immuno suppressive agent in organ transplantation.

D. *Saccharomyces* cerevisiae $\rightarrow$ Used for commercial production of ethanol

E. *Propionibacterium sharmanii* $\rightarrow$ Used to make swiss cheese

122. Given below are two statements:

Statement I : Fig fruit is a non-vegetarian fruit as it has enclosed fig wasps in it.

Statement II : Fig wasp and fig tree exhibit mutual relationship as fig wasp completes its life cycle in fig fruit and fig fruit gets pollinated by fig wasp."In the light of the above statements, choose the most appropriate answer from the options given below :

(1) Statement I is incorrect but statement II is correct

(2) Both statement I and statement II are correct

(3) Both statement I and statement II are incorrect

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

Ans. (2)

Sol. Both statement I and statement II are correct

Fig and Wasp shows mutualism (Population Interaction).

123. Role of the water vascular system in Echinoderms is :

A. Respiration and Locomotion

B. Excretion and Locomotion

C. Capture and transport of food

D. Digestion and Respiration

E. Digestion and Excretion

Choose the correct answer from the options given below :

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

Ans. (3)

Sol. The most distinctive feature of echinodermata is the presence of water vascular system which helps in locomotion, capture and transport of food and respiration.

124. After maturation, in primary lymphoid organs, the lymphocytes migrate for interaction with antigens to secondary lymphoid organ(s) /tissue(s) like:

A. Thymus B. Bone marrow

C. Spleen D. Lymph nodes

E. Peyer's patches

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

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

Ans. (1)

Sol. Secondary lymphoid organs like spleen, lymph nodes, Peyer's patches, vermiform appendix, tonsil etc provide site for interaction with antigens.

125. Match List I with List II :

A. The Evil Quartet	I. Cryopreservation
B. Ex situ conservation	II. Alien species invasion
C. *Lantana camara*	III. Causes of biodiversity losses
D. Dodo	IV. Extinction

Choose the option with all **correct** matches.

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

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

Ans. (3)

Sol. A-III, B-I, C-II, D-IV (Conservation of Biodiversity)

126. Read the following statements on plant growth and development.

A. Parthenocarpy can be induced by auxins.

B. Plant growth regulators can be involved in promotion as well as inhibition of growth.

C. Dedifferentiation is a pre-requisite for redifferentiation.

D. Abscisic acid is a plant growth promoter.

E. Apical dominance promotes the growth of lateral buds.

Choose the options with all **correct** statements.

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

Ans. (2)

Sol. A, B, C only (From Plant growth regulators)

127. Match List-I with List-II.

List-I	**List-II**
A. Pteridophyte	I. Salvia
B. Bryophyte	II. Ginkgo
C. Angiosperm	III. Polytrichum
D. Gymnosperm	IV. Salvinia

Choose the option with all **correct** matches.

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

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

Ans. (3)

Sol. A-IV, B-III, C-I, D-II (Plant Diversity)

128. Why can't insulin be given orally to diabetic patients?

(1) Its bioavailability will be increased

(2) Human body will elicit strong immune response

(3) It will be digested in Gastro-Intestinal (GI) tract

(4) Because of structural variation

Ans. (3)

Sol. Insulin can't be given orally to diabetic patients because it will be digested in GI tract by proteolytic enzymes.

129. Which one of the following is the characteristic feature of gymnosperms?

(1) Gymnosperms have flowers for reproduction.

(2) Seeds are enclosed in fruits.

(3) Seeds are naked.

(4) Seeds are absent.

Ans. (3)

Sol. Gymnosperms are characterised by nacked seeds.

130. Frogs respire in water by skin and buccal cavity and on land by skin, bûccal cavity and lungs.

Choose the **correct** answer from the following :

(1) The statement is falser both the environment

(2) The statement is true for water but false for land

(3) The statement is true for both the environment

(4) The statement is false for water but true for land

Ans. (4)

Sol. Frog respires in water by skin while on land by skin, buccal cavity and lungs.

131. Silencing of specific mRNA is possible via RNA because of -

(1) Non-complementary ssR N A

(2) Complementary dsRNA

(3) Inhibitory ssRNA

(4) Complementary tRNA

Ans. (2)

Sol. Silencing of specific mRNA is possible via RNAi because of complementary dsRNA

132. Twins are born to a family that lives next door to you. The twins are a boy and a girl. Which of the following must be true?
(1) They have 75% identical genetic content.
(2) They are monozygotic twins.
(3) They are fraternal twins.
(4) They were conceived through in vito fertilization.

Ans. **(3)**

Sol. Fraternal twins are non-identical/dizygotic twins.

133. Match List-I with List-II :

List-I	**List-II**
A. Scutellum	I. Persistent nucellus
B. Non-albuminous seed	II. Cotyledon of Monocot seed
C. Epiblast	III. Groundnut
D. Perisperm	IV. Rudimentary cotyledon

Choose the option with all **correct** matches.
(1)A-II,B-IV,C-III,D-I (2)A-II,B-III,C-IV,D-I
(3)A-IV,B-III,C-II,D-I (4)A-IV,B-III,C-I,D-II

Ans. **(2)**

Sol. A-II,B-III,C-IV,D-I (From Sexual reproduction in flowering plant)

134. In frog,the Renal portal system is a special venous connection that acts to link :
(1) Kidney and lower part of body (2) Liver and intestine
(3) Liver and kidney (4) Kidney and intestine

Ans. **(1)**

Sol. Renal portal system found in frog is a speical venous connection that acts to link kidney & lower part of body.

135. Match List I with list II :

List I	**List II**
A. Heart	I.Erythropoietin
B.Kidney	II.Aldosterone
C.Gastro-intestinal tract	III.Atrial natriuretic factor
D.Adrenal Cortex	IV.Secretin

Choose the **correct** answer from the options given below :
(1) A-III,B-I,CIV,D-II (2)A-II,B-I,C-III, D-IV
(3) A-IV,B-III,C-II,D-I (4)A-I,B-III,C-IV,D-II

Ans. **(1)**

136. Cardiac activities of the heart are regulated by :

A. Nodal tissue.

B. A special neural centre in the medulla oblongata.

C. Adrenal medullary hormones.

D. Adrenal cortical hormones.

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

(1) A, B and D Only (2) A, B and C Only

(3) A, B, C and D (4) A, C and D Only

Ans. (2)

Sol. Cardiac activities of heart are regulated by -

Nodal tissue (SAN, AVN etc.)

Medulla oblangata (Cardiac centre)

Adrenal medullary hormones such as adrenaline/Nor-adrenaline.

137. Streptokinase produced by bacterium Streptococcus is used for :

(1) Removing clots from blood vessels

(2) Curd production

(3) Ethanol production

(4) Liver disease treatment

Ans. (1)

Sol. Streptokinase produced by bacterium Streptococcus is used for removing clots from blood vessels (Also known as 'clot buster').

138. Who is known as the father of Ecology in India ?

(1) Birbal Sahni (2) S. R. Kashyap

(3) Ramdeo Misra (4) Ram Udar

Ans. (3)

Sol. Father of Indian ecology $\rightarrow$ Ramdeo Misra

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

Assertion (A) : A typical unfertilised, angiosperm embryo sac at maturity is 8 nucleate and 7-celled.

Reason (R) : The egg apparatus has 2 polar nuclei.

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

(1) A is false but R is true.

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

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

(4) A is true but R is false.

Ans. **(4)**

Sol. A is true but R is false (Egg apparatus has 2 synergids and 1 egg cell).

140. Neoplastic characteristics of cells refer to :

A. A mass of proliferating cell.

B. Rapid growth of cells.

C. Invasion and damage to the surrounding tissue.

D. Those confined to original location.

Choose the correct answer from the options given below :

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

Ans. **(3)**

Sol. Neoplastic characteristics of cells refers to -

Mass of proliferating cells
Rapid growth of cells
→ Due to loss of cell control

Invasion and damage to the surrounding tissue because cancer cells starve normal cells by competing for vital nutrients.

141. Given below are the stages in the life cycle of pteridophytes. Arrange the following stages in the **correct** sequence.

A. Prothallus stage.

B. Meiosis in spore mother cells.

C. Fertilisation.

D. Formation of archegonia and antheridia in gametophyte.

E. Transfer of antherozoids to the archegonia in presence of water.

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

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

Ans. **(2)**

Sol. B, A, D, E, C

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

Assertion (A) : Both wind and water pollinated flowers are not very colourful and do not produce nectar.

Reason (R) : The flowers produce enormous amount of pollen grains in wind and water pollinated flowers.

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

(1) A is false but R is true.

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

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

(4) A is true but R is false.

Ans. **(3)**

Sol. Both A and R are true but R is not the correct explanation of A.

143. Which one of the following enzymes contains 'Haem' as the prosthetic group ?

(1) Catalase (2) RuBisCo

(3) Carbonic anhydrase (4) Succinate dehydrogenase

Ans. **(1)**

Sol. Catalase enzyme contains Haem as the prosthetic group.

144. Match List-I with List-II.

List-I	List-II
A. Emphysema	I. Rapid spasms in muscle due to low Ca^{++} in body fluid
B. Angina Pectoris	II. Damaged alveolar walls and decreased respiratory surface
C. Glomerulonephritis	III. Acute chest pain when not enough oxygen is reaching to heart muscle.
D. Tetany	IV. Inflammation of glomeruli of kidney.

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

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

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

Ans. (1)

145. Find the statement that is **not** correct with regard to the structure of monocot stem :

(1) Phloem parenchyma is absent. (2) Hypodermis is parenchymatous.

(3) Vascular bundles are scattered. (4) Vascular bundles are conjoint and closed.

Ans. (2)

Sol. Hypodermis of monocot stem is schlerenchymatous.

146. Which of the following statement is **correct** about location of the male frog copulatory pad:

(1) First digit of the fore limb

(2) First and Second digit of fore limb

(3) First digit of hind limb

(4) Second digit of fore limb

Ans. (1)

Sol. In male frog copulatory pads are found in first digit of the fore limb.

147. Given below are two statements :

Statement-I : The primary source of energy in an ecosystem is solar energy.

Statement-II : The rate of production of organic matter during photosynthesis in an ecosystem is called net primary productivity (NPP).

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

(1) Statement I is incorrect but statement II is correct.

(2) Both statement I and statement II are correct.

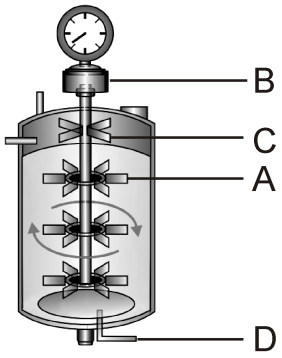
(3) Both statement I and statement II are incorrect.

(4) Statement I is correct but statement II is incorrect.

Ans. (4)

Sol. Statement I is correct but statement II is incorrect (Statement-II is for GPP and not for NPP).

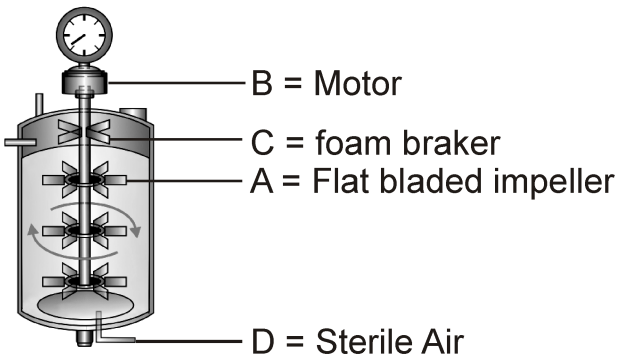
148. Identify the part of a bio-reactor which is used as a foam braker from the given figure:



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

Ans. (1)

Sol.



149. Polymerase chain reaction (PCR) amplifies DNA following the equation :

(1) $2N^2$ (2) N^2 (3) 2^n (4) 2n + 1

Ans. (3)

Sol. PCR amplifies DNA following the equation $\rightarrow 2^n$

150. Match List-I with List-II :

List-I	**List-II**
A. Head	I. Enzymes
B. Middle piece	II. Sperm motility
C. Acrosome	III. Energy
D. Tail	IV. Genetic material

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

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

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

Ans. (2)

151. Given below are two statements :

Statement-I : In a floral formula $\oplus$ stands for zygomorphic nature of the flower and $\underline{G}$ stands for inferior ovary.

Statement-II : In a floral formula $\oplus$ stands for actinomorphic nature of the flower and $\underline{G}$ stands for superior ovary.

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

(1) Statement-I is incorrect but Statement-II is correct.

(2) Both Statement-I and Statement-II are correct.

(3) Both Statement-I and Statement-II is incorrect.

(4) Statement-I is correct but Statement-II is incorrect.

Ans. (1)

Sol. Statement-I is incorrect but Statement-II is correct ($\oplus$ stands for actinomorphic nature of the flower and $\underline{G}$ stands for superior ovary.)

152. From the statements given below choose the **correct** option :

A. The eukaryotic ribosomes are 80S and prokaryotic ribosomes are 70S.

B. Each ribosome has two sub-units.

C. The two sub-units of 80S ribosome are 60S and 40S while that of 70S are 50S and 30S.

D. The two sub-units of 80S ribosome are 60S and 20S and that of 70S are 50S and 20S.

E. The two sub-units of 80S are 60S and 30S and that of 70S are 50S and 30S.

(1) B, D, E are true (2) A, B, C are true (3) A, B, D are true (4) A, B, E are true

Ans. **(2)**

Sol. A, B, C are true

Prokaryotic ribosome $\rightarrow$ 70S (50S + 30S)

Eukaryotic ribosome $\rightarrow$ 80S (60S + 40S)

153. Each of the following characteristics represent a kingdom proposed by Whittaker. Arrange the following in increasing order of complexity of body organization :

A. Multicellular heterotrophs with cell wall made of chitin.

B. Heterotrophs with tissue/organ/organ system level of body organization.

C. Prokaryotes with cell wall made of polysaccharides and amino acids.

D. Eukaryotic autotrophs with tissue/organ level of body organization.

E. Eukaryotes with cellular body organization.

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

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

Ans. **(3)**

Sol. C, E, A, D, B

C. Prokaryotes with cell wall made of polysaccharides and amino acids $\rightarrow$ Kingdom monera.

E. Eukaryotes with cellular body organization $\rightarrow$ Kingdom protista.

A. Multicellular heterotrophs with cell wall made of chitin $\rightarrow$ Kingdom fungi.

D. Eukaryotic autotrophs with tissue/organ level of body organization $\rightarrow$ Kingdom plantae.

B. Heterotrophs with tissue/organ/organ system level of body organization $\rightarrow$ Kingdom animalia.

154. The **correct** sequence of events in the life cycle of bryophytes is :

A. Fusion of antherozoid with egg.

B. Attachment of gametophyte to substratum.

C. Reduction division to produce haploid spores.

D. Formation of sporophyte.

E. Release of antherozoids into water.

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

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

Ans. **(4)**

Sol. B, E, A, D, C

B. Attachment of gametophyte to substratum.

E. Release of antherozoids into water.

A. Fusion of antherozoid with egg.

D. Formation of sporophyte.

C. Reduction division to produce haploid spores.

155. Which are **correct** :

A. Computed tomography and magnetic resonance imaging detect cancers of internal organs.

B. Chemotherapeutics drugs are used to kill non-cancerous cells.

C. α-interferon activate the cancer patients immune system and helps in destroying the tumour.

D. Chemotherapeutic drugs are biological response modifiers.

E. In the case of leukaemia blood cell counts are decreased.

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

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

Ans. **(1)**

Sol. Chemotherapeutic drugs are used to kill cancerous cell.

α-Interferon are biological response modifier.

In leukemia blood cell count increases.

156. Name the class of enzyme that usually catalyze the following reaction :

$S - G + S^{\#} \rightarrow S + S^{\#} - G$

Where, G $\rightarrow$ a group other than hydrogen

S $\rightarrow$ a substrate

$S^{\#}$ $\rightarrow$ Another substrate

(1) Ligase (2) Hydrolase (3) Lyase (4) Transferase

Ans. (4)

Sol. In given reaction G is transfered from S to $S^{\#}$ this reaction is catalysed by transferase enzyme.

157. Find the correct statements :

A. In human pregnancy, the major organ systems are formed at the end of 12 weeks.

B. In human pregnancy the major organ systems are formed at the end of 8 weeks.

C. In human pregancy heart is formed after one mother of gestation.

D. In human pregnancy, limbs and digits develop by the end of second moth.

E. In human pregnancy the appearance of hair is usually observed in the fifth month.

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

(1) A, C, D and E Only (2) A and E Only

(3) B and C Only (4) B, C, D and E Only

Ans. (1)

Sol. In human pregnancy, the major organ systems ae formed at the end of 12 weeks.

158. Which of the following is an example of non-distilled alcoholic beverage produced by yeast?

(1) Rum (2) Whisky

(3) Brandy (4) Beer

Ans. (4)

Sol. Distilled alcoholic beverage $\rightarrow$ Rum, Whisky and Brandy

Non-distilled alcoholic beverage $\rightarrow$ Beer

159. Given below are two statements :

Statement-I : In the RNA world, RNA is considered the first genetic material evolved to carry out essential life processes. RNA acts as a genetic material and also as a catalyst for some important biochemical reactions in living systems. Being reactive, RNA is unstable.

Statement-II : DNA evolved from RNA and is a more stable genetic material. Its double helical strands being complementary, resist changes by evolving repairing mechanism.

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

(1) Statement-I is incorrect but statement-II is correct.

(2) Both statement-I and Statement-II are correct.

(3) Both Statement-I and Statement-II are incorrect.

(4) Statement-I is correct but Statement-II is incorrect.

Ans. (2)

Sol. Both statement-I and Statement-II are correct (From molecular basis of inheritance).

160. Gvien below are two statements :

Statement-I : Transfer RNAs and ribosomal RNA do not interact with mRNA.

Statement-II : RNA interference (RNAi) takes place in all eukaryotic organisms as a method of cellular defence.

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

(1) Statement-I is incorrect but Statement-II is correct

(2) Both Statement-I and Statement-II are correct.

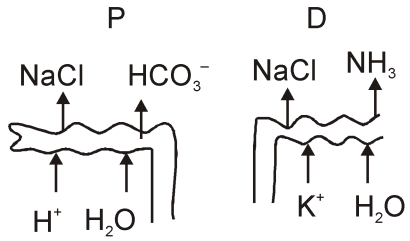
(3) Both Statement-I and Statement-II are incorrect.

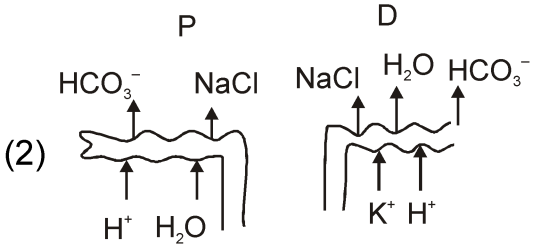
(4) Statement-I is correct but Statement-II is incorrect.

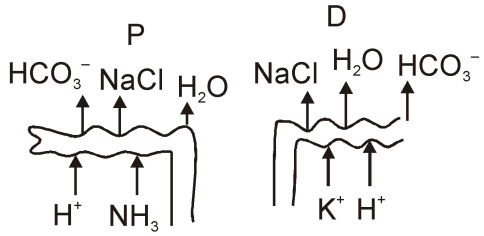
Ans. (1)

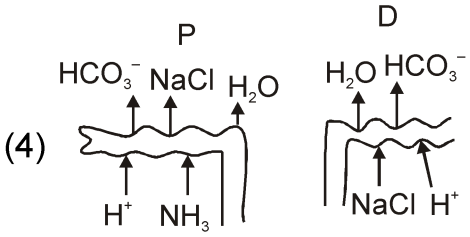
Sol. Transfer RNAs and ribosomal RNA interact with mRNA.

161. Which of the following diagrams is correct with regard to the proximal (P) and distal (D) tubule of the Nephron.

(1) 

(2) 

(3) 

(4) 

Ans. (3)

Sol. PCT
- Absorption - HCO_3^-, NaCl, H_2O
- Secretion - H^+, NH_3

DCT
- Absorption - NaCl, H_2O, HCO_3^-
- Secretion - K^+, H^+

162. What is the pattern of inheritance for polygenic trait?

(1) X-linked recessive inheritance pattern

(2) Mendelian inheritance pattern

(3) Non-mendelian inheritance pattern

(4) Autosomal dominant pattern

Ans. (3)

Sol. Polygenic trait → Non-mendelian inheritance pattern

163. In the seeds of cereals, the outer covering of endosperm separates the embryo by a protein rich layer called :

(1) Aleurone layer (2) Coleoptile (3) Coleorhiza (4) Integument

Ans. (1)

Sol. Aleurone layer (Monocot seed structure)

164. Match Column-I with Column-II :

Column-I	Column-II
A. Chlorophyll a	I. Yello-green
B. Chlorophyll b	II. Yellow
C. Xanthophylls	III. Blue-green
D. Carotenoids	IV. Yellow to yellow orange

Choose the option with all **correct** matches:

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

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

Ans. (3)

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

(Pigment)		(Colour in chromatogram)
A. Chlorophyll a	→	Blue-green
B. Chlorophyll b	→	Yello-green
C. Xanthophylls	→	Yellow
D. Carotenoids	→	Yellow to yellow orange

165. Which of the following genetically engineered organisms was used by Eli Lilly to prepare human insulin?

(1) Phage (2) Bacterium (3) Yeast (4) Virus

Ans. (2)

Sol. E.coli bacterium is used by Eli lilly to prepare human insulin.

166. Which of the following are the post transcriptional events in an eukaryotic cell?

A. Transport of pre-mRNA to cytoplasm prior to splicing.

B. Removal of introns and joining of exons.

C. Addition of methyl group at 5' end of hnRNA.

D. Addition of adenine residues at 3' end of hnRNA.

E. Base pairing of two complementary RNAs.

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

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

Ans. (3)

Sol. Correct post transcriptional events in an eukaryotic cell → B, C, D only

167. Match Column-I with Column-II :

Column-I	Column-II
A. Centromere	I. Mitochondrion
B. Cilium	II. Cell division
C. Cristae	III. Cell movement
D. Cell membrane	IV. Phospholipid Bilayer

Choose the option with all **correct** matches:

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

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

Ans. **(1)**

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

A. Centromere → Cell division

B. Cilium → Cell movement

C. Cristae → Mitochondrion

D. Cell membrane → Phospholipid Bilayer

168. Match Column-I with Column-II :

Column-I	Column-II
A. Alfred Hershey and Martha Chase	I. Streptococcus pneumoniae
B. Euchromatin	II. Loosely packed and light-stained
C. Frederick Griffith	III. Loosely packed and light-stained
D. Heterochromatin	IV. DNA as genetic material confirmation

Choose the option with all **correct** matches :

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

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

Ans. **(4)**

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

A. Alfred Hershey and Martha Chase → DNA as genetic material confirmation

B. Euchromatin → Loosely packed and light-stained

C. Frederick Griffith → Streptococcus pneumoniae

D. Heterochromatin → Loosely packed and light-stained

169. Which chromosome in the human genome has the highest number of genes?

(1) Chromosome 10 (2) Chromosome X (3) Chromosome Y (4) Chromosome 1

Ans. (4)

Sol. In the human genome highest number of genes (2968) are present on chromosome 1

170. What are the potential drawbacks in adoption of the IVF method?

A. High fatality risk to mother

B. Expensive instruments and reagents

C. Husband/wife necessary for being donors

D. Less adoption of orphans

E. Not available in India

F. Possibility that the early embryo does not survive

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

(1) A, B, C, E, F only (2) B, D, F only

(3) A, C, D, F only (4) A, B,C, D only

Ans. (2)

Sol. No risk to mother in IVF since it is a non-surgical procedure.

Gametes can be taken from healthy donor also.

171. Which one of the following is an example of ex-situ conservation?

(1) Protected areas (2) National Park

(3) Wildlife Sanctuary (4) Zoos and botanical gardens

Ans. (4)

Sol. Ex-situ conservation $\rightarrow$ Zoos and botanical gardens

172. A specialised membranous structure in a prokaryotic cell which helps in cell wall formation, DNA replication and respiration is :

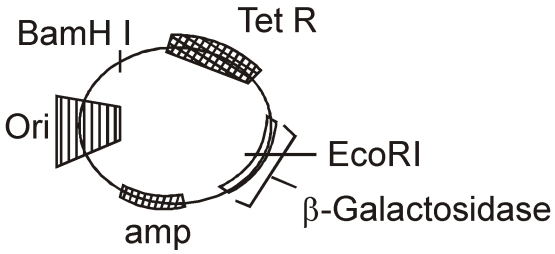
(1) Endoplasmic Reticulum (2) Mesosome

(3) Chromatophores (4) Cristae

Ans. (2)

Sol. A specialised membranous structure in a prokaryotic cell which helps in cell wall formation, DNA replication and respiration is mesosome.

173. In the following represented plasmid an alien piece of DNA is inserted at EcoRI site. Which of the following strategies will be chosen to select the recombinant colonies?



(1) Blue color colonies grown an ampicillin plates can be selected.

(2) Using ampicillin & tetracyclin containing medium plate.

(3) Blue color colonies will be selected.

(4) White color colonies will be selected.

Ans. **(4)**

Sol. Insertional inactivation : Due to insertion of desired gene, native gene (β-galatosidase gene) gets inactive. So recombinant show white colonies in the absence of β-galactosidase enzyme.

174. What is the name of the blood vessel that carries deoxygenated blood from the body to the heart in a frog?

(1) Vena cava (2) Aorta (3) Pulmonary artery (4) Pulmonary vein

Ans. **(1)**

Sol. Vena cava carries deoxygenated blood from body to heart.

175. Which of the following organisms cannot fix nitrogen?

A. Azotobacter

B. Oscillatoria

C. Anabaena

D. Volvox

E. Nostoc

Choose the correct answer from the options given below :

(1) E only (2) A only (3) D only (4) B only

Ans. **(3)**

Sol. All except *volvox* can fix nitrogen.

176. While trying to find out the characteristic of a newly found animal. a researcher did the histology of adult animal and observed a cavity with presence of mesodermal tissue towards the body wall but no mesodermal tissue was observed towards the alimentary cannal.

What could be the possible coelome of that animal?

(1) Spongocoelomate

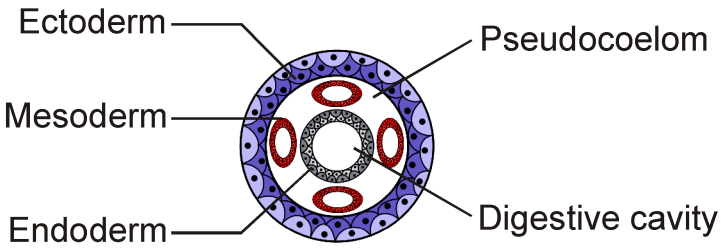
(2) Acoelomate

(3) Pseudocoelomate

(4) Schizocoelomate

Ans. (3)

Sol. The mesoderm is present as scattered pouches in between ectoderm and endoderm.



177. Which one of the following statements refers to Reductionist Biology?

(1) Behavioural approach to study and understand living organisms.

(2) Physico-chemical approach to study and understand living organisms.

(3) Physiological approach to study and understand living organisms.

(4) Chemical approach to study adn understand living organisms.

Ans. (2)

Sol. Reductionist Biology $\rightarrow$ Physico-chemical approach to study and understand living organisms (From introductory part of cell biology).

178. Epiphytes that are growing on a mango branch is an example of which of the following?

(1) Amensalism (2) Commensalism (3) Mutualism (4) Predation

Ans. (2)

Sol. Epiphytes growing on a mango branch shows commensalism.

179. Which one of the following phytohormones promotes nutrient mobilization which helps in the delay of leaf senescence in plants?

(1) Cytokinin (2) Ethylene (3) Abscisic acid (4) Gibberellin

Ans. (1)

Sol. Cytokinin

180. The complex II of mitochondrial electron transport chain is also known as :

(1) NADH dehydrogenase (2) Cytochrome bc_1

(3) Succinate dehydrogenase (4) Cytochrome c oxidase

Ans. (3)

Sol. Complex II of mitochondrial electron transport chain is also known as $\rightarrow$ Succinate dehydrogenase