

63. In the electrochemical cell :

$\text{Zn}|\text{ZnSO}_4(0.01\text{M})||\text{CuSO}_4(1.0\text{M})|\text{Cu}$, the emf of this Daniel cell is E_1 . When the concentration of ZnSO_4 is changed to 1.0 M and that of CuSO_4 changed to 0.01 M, the emf changes to E_2 . From the following, which one is the relationship between E_1 and E_2 ?

(Given, $\frac{RT}{F} = 0.059$)

- (1) $E_1 = E_2$ (2) $E_1 < E_2$
(3) $E_1 > E_2$ (4) $E_2 = 0 \neq E_1$

Answer (3)

Sol. $\text{Zn}|\text{ZnSO}_4(0.01\text{M})||\text{CuSO}_4(1.0\text{M})|\text{Cu}$

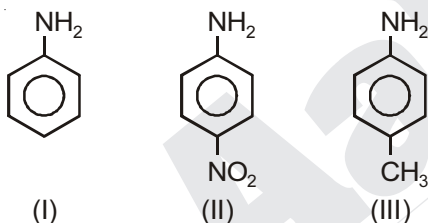
$$\therefore E_1 = E_{\text{cell}}^{\circ} - \frac{2.303RT}{2 \times F} \times \log \frac{(0.01)}{1}$$

When concentrations are changed

$$\therefore E_2 = E_{\text{cell}}^{\circ} - \frac{2.303RT}{2F} \times \log \frac{1}{0.01}$$

i.e., $E_1 > E_2$

64. The correct increasing order of basic strength for the following compounds is

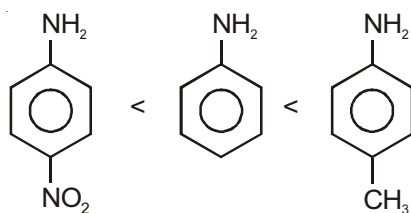


- (1) $\text{II} < \text{III} < \text{I}$ (2) $\text{III} < \text{I} < \text{II}$
(3) $\text{III} < \text{II} < \text{I}$ (4) $\text{II} < \text{I} < \text{III}$

Answer (4)

Sol. $-\text{NO}_2$ has strong $-\text{R}$ effect and $-\text{CH}_3$ shows $+\text{R}$ effect.

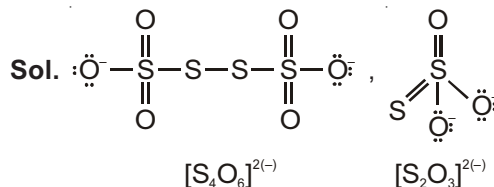
\therefore Order of basic strength is



65. In which pair of ions both the species contain S – S bond?

- (1) $\text{S}_2\text{O}_7^{2-}$, $\text{S}_2\text{O}_3^{2-}$ (2) $\text{S}_4\text{O}_6^{2-}$, $\text{S}_2\text{O}_3^{2-}$
(3) $\text{S}_2\text{O}_7^{2-}$, $\text{S}_2\text{O}_8^{2-}$ (4) $\text{S}_4\text{O}_6^{2-}$, $\text{S}_2\text{O}_7^{2-}$

Answer (2)



66. The correct order of the stoichiometries of AgCl formed when AgNO_3 in excess is treated with the complexes : $\text{CoCl}_3 \cdot 6\text{NH}_3$, $\text{CoCl}_3 \cdot 5\text{NH}_3$, $\text{CoCl}_3 \cdot 4\text{NH}_3$ respectively is

- (1) 1 AgCl , 3 AgCl , 2 AgCl
(2) 3 AgCl , 1 AgCl , 2 AgCl
(3) 3 AgCl , 2 AgCl , 1 AgCl
(4) 2 AgCl , 3 AgCl , 1 AgCl

Answer (3)

Sol. Complexes are respectively $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$, $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$ and $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$

67. Match the interhalogen compounds of column I with the geometry in column II and assign the correct code

Column I	Column II
(a) XX'	(i) T-shape
(b) XX'_3	(ii) Pentagonal bipyramidal
(c) XX'_5	(iii) Linear
(d) XX'_7	(iv) Square-pyramidal
	(v) Tetrahedral

Code :

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

Answer (2)

Sol. $\text{XX}' \rightarrow$ Linear

$\text{XX}'_3 \rightarrow$ Example : $\text{ClF}_3 \rightarrow$ T-shape

$\text{XX}'_5 \rightarrow$ Example : $\text{BrF}_5 \rightarrow$ Square pyramidal

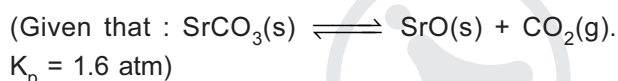
$\text{XX}'_7 \rightarrow$ Example : $\text{IF}_7 \rightarrow$ Pentagonal bipyramidal

68. The reason for greater range of oxidation states in actinoids is attributed to
- (1) The radioactive nature of actinoids
 - (2) Actinoid contraction
 - (3) $5f$, $6d$ and $7s$ levels having comparable energies
 - (4) $4f$ and $5d$ levels being close in energies

Answer (3)

Sol. It is a fact.

69. A 20 litre container at 400 K contains $\text{CO}_2(\text{g})$ at pressure 0.4 atm and an excess of SrO (neglect the volume of solid SrO). The volume of the container is now decreased by moving the movable piston fitted in the container. The maximum volume of the container, when pressure of CO_2 attains its maximum value, will be



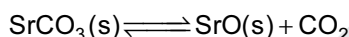
$$K_p = 1.6 \text{ atm}$$

- (1) 5 litre
- (2) 10 litre
- (3) 4 litre
- (4) 2 litre

Answer (1)

Sol. Max. pressure of CO_2 = Pressure of CO_2 at equilibrium

For reaction,



$$K_p = P_{\text{CO}_2} = 1.6 \text{ atm} = \text{maximum pressure of } \text{CO}_2$$

Volume of container at this stage,

$$V = \frac{nRT}{P} \quad \dots(i)$$

Since container is sealed and reaction was not earlier at equilibrium

$\therefore n = \text{constant}$

$$n = \frac{PV}{RT} = \frac{0.4 \times 20}{RT} \quad \dots(ii)$$

Put equation (ii) in equation (i)

$$V = \left[\frac{0.4 \times 20}{RT} \right] \frac{RT}{1.6} = 5 \text{ L}$$

70. The correct statement regarding electrophile is
- (1) Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile
 - (2) Electrophile is a positively charged species and can form a bond by accepting a pair of electrons from another electrophile

- (3) Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile
- (4) Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile

Answer (4)

Sol. Fact.

71. Which of the following is a sink for CO ?

- (1) Haemoglobin
- (2) Micro-organisms present in the soil
- (3) Oceans
- (4) Plants

Answer (2)

Sol. Micro-organisms present in the soil is a sink for CO .

72. The element $Z = 114$ has been discovered recently. It will belong to which of the following family group and electronic configuration?

- (1) Halogen family, $[\text{Rn}] 5f^{14}6d^{10}7s^27p^5$
- (2) Carbon family, $[\text{Rn}] 5f^{14}6d^{10}7s^27p^2$
- (3) Oxygen family, $[\text{Rn}] 5f^{14}6d^{10}7s^27p^4$
- (4) Nitrogen family, $[\text{Rn}] 5f^{14}6d^{10}7s^27p^6$

Answer (2)

Sol. $Z = 114$ belong to Group 14, carbon family

$$\text{Electronic configuration} = [\text{Rn}]5f^{14}6d^{10}7s^27p^2$$

73. Correct increasing order for the wavelengths of absorption in the visible region for the complexes of Co^{3+} is

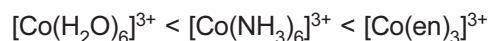
- (1) $[\text{Co}(\text{en})_3]^{3+}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$, $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$
- (2) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$, $[\text{Co}(\text{en})_3]^{3+}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$
- (3) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$, $[\text{Co}(\text{en})_3]^{3+}$
- (4) $[\text{Co}(\text{NH}_3)_6]^{3+}$, $[\text{Co}(\text{en})_3]^{3+}$, $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$

Answer (1)

Sol. The order of the ligand in the spectrochemical series



Hence, the wavelength of the light observed will be in the order



Thus, wavelength absorbed will be in the opposite order



74. Which of the following statements is not correct?
- (1) Insulin maintains sugar level in the blood of a human body
 - (2) Ovalbumin is a simple food reserve in egg-white
 - (3) Blood proteins thrombin and fibrinogen are involved in blood clotting
 - (4) Denaturation makes the proteins more active

Answer (4)

Sol. Due to denaturation of proteins, globules unfold and helix get uncoiled and protein loses its biological activity.

75. An example of a sigma bonded organometallic compound is :
- (1) Ruthenocene
 - (2) Grignard's reagent
 - (3) Ferrocene
 - (4) Cobaltocene

Answer (2)

Sol. Grignard's reagent *i.e.*, RMgX is σ -bonded organometallic compound.

76. Which of the following is dependent on temperature?
- (1) Molality
 - (2) Molarity
 - (3) Mole fraction
 - (4) Weight percentage

Answer (2)

Sol. Molarity includes volume of solution which can change with change in temperature.

77. For a given reaction, $\Delta H = 35.5 \text{ kJ mol}^{-1}$ and $\Delta S = 83.6 \text{ JK}^{-1} \text{ mol}^{-1}$. The reaction is spontaneous at : (Assume that ΔH and ΔS do not vary with temperature)
- (1) $T < 425 \text{ K}$
 - (2) $T > 425 \text{ K}$
 - (3) All temperatures
 - (4) $T > 298 \text{ K}$

Answer (2)

Sol. $\therefore \Delta G = \Delta H - T\Delta S$

For a reaction to be spontaneous, $\Delta G = -ve$

i.e., $\Delta H < T\Delta S$

$$\therefore T > \frac{\Delta H}{\Delta S} = \frac{35.5 \times 10^3 \text{ J}}{83.6 \text{ JK}^{-1}}$$

i.e., $T > 425 \text{ K}$

78. The most suitable method of separation of 1 : 1 mixture of ortho and para-nitrophenols is
- (1) Sublimation
 - (2) Chromatography
 - (3) Crystallisation
 - (4) Steam distillation

Answer (4)

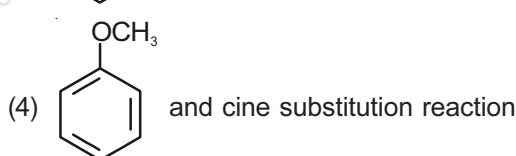
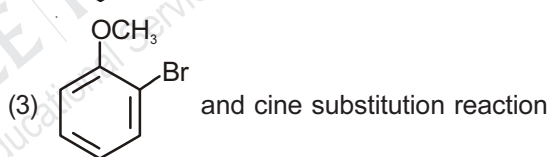
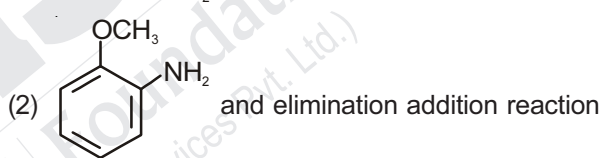
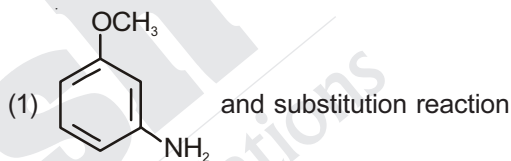
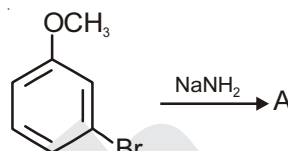
Sol. Steam distillation is the most suitable method of separation of 1 : 1 mixture of ortho and para nitrophenols as there is intramolecular H-bonds in ortho nitrophenol.

79. Which one of the following pairs of species have the same bond order?
- (1) CO, NO
 - (2) O_2 , NO^+
 - (3) CN^- , CO
 - (4) N_2 , O_2^-

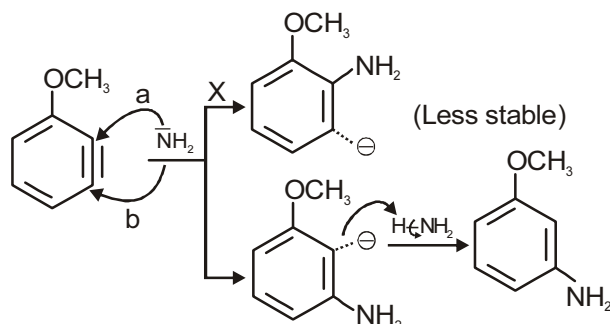
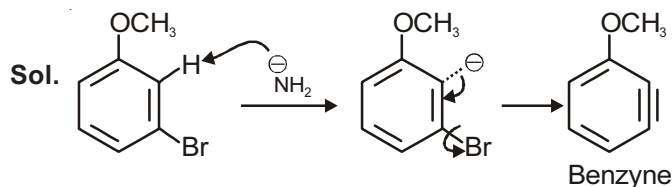
Answer (3)

Sol. CN^- and CO have bond order 3 each.

80. Identify A and predict the type of reaction



Answer (1)



More stable as -ve charge is close to electron withdrawing group

∴ Incoming nucleophile ends on same 'C' on which 'Br' (Leaving group) was present

∴ **NOT** cine substitution.

81. A first order reaction has a specific reaction rate of 10^{-2} s^{-1} . How much time will it take for 20 g of the reactant to reduce to 5 g?

- (1) 238.6 second (2) 138.6 second
(3) 346.5 second (4) 693.0 second

Answer (2)

$$\text{Sol. } t_{1/2} = \frac{0.693}{10^{-2}} \text{ second}$$

For the reduction of 20 g of reactant to 5 g, two $t_{1/2}$ is required.

$$\begin{aligned} \therefore t &= 2 \times \frac{0.693}{10^{-2}} \text{ second} \\ &= 138.6 \text{ second} \end{aligned}$$

82. Name the gas that can readily decolourises acidified KMnO_4 solution:

- (1) CO_2 (2) SO_2
(3) NO_2 (4) P_2O_5

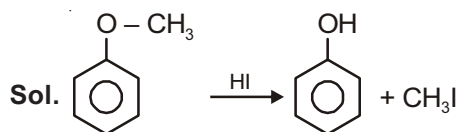
Answer (2)

Sol. SO_2 is readily decolourises acidified KMnO_4 .

83. The heating of phenyl-methyl ethers with HI produces.

- (1) Ethyl chlorides
(2) Iodobenzene
(3) Phenol
(4) Benzene

Answer (3)



84. Pick out the correct statement with respect $[\text{Mn}(\text{CN})_6]^{3-}$:

- (1) It is sp^3d^2 hybridised and octahedral
(2) It is sp^3d^2 hybridised and tetrahedral
(3) It is d^2sp^3 hybridised and octahedral
(4) It is dsp^2 hybridised and square planar

Answer (3)

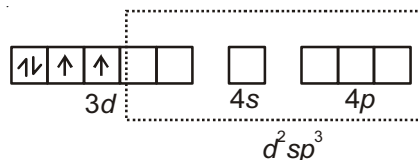
Sol. $[\text{Mn}(\text{CN})_6]^{3-}$

$$\text{Mn(III)} = [\text{Ar}]3d^4$$

CN^- being strong field ligand forces pairing of electrons

$$\text{This gives } t_{2g}^4 e_g^0$$

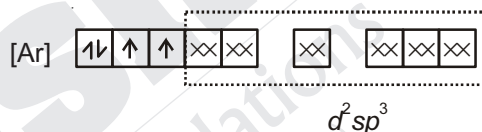
$$\therefore \text{Mn(III)} = [\text{Ar}]$$



∴ Coordination number of Mn = 6

∴ Structure = octahedral

$$[\text{Mn}(\text{CN})_6]^{3-} =$$



85. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field?

- (1) Na (2) K
(3) Rb (4) Li

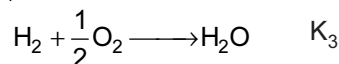
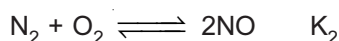
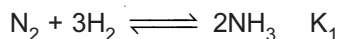
Answer (4)

Sol. Li^+ being smallest, has maximum charge density

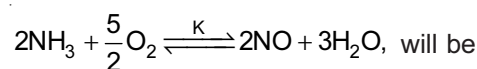
∴ Li^+ is most heavily hydrated among all alkali metal ions. Effective size of Li^+ in aq solution is therefore, largest.

∴ Moves slowest under electric field.

86. The equilibrium constants of the following are.

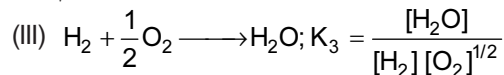
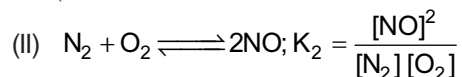
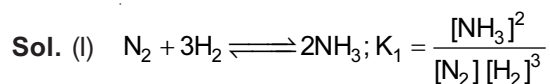


The equilibrium constant (K) of the reaction:

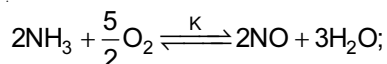


- (1) $K_1K_3^3 / K_2$ (2) $K_2K_3^3 / K_1$
(3) K_2K_3 / K_1 (4) $K_2^3K_3 / K_1$

Answer (2)



(II + 3 × III - I) will give

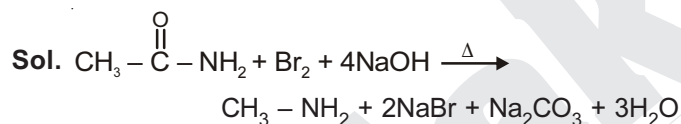


$$\therefore K = K_2 \times K_3^3 / K_1$$

87. Which of the following reactions is appropriate for converting acetamide to methanamine?

- (1) Carbylamine reaction
- (2) Hoffmann hypobromamide reaction
- (3) Stephens reaction
- (4) Gabriels phthalimide synthesis

Answer (2)



This is Hoffmann Bromamide reaction.

88. Mechanism of a hypothetical reaction $X_2 + Y_2 \rightarrow 2XY$ is given below :

- (i) $X_2 \rightarrow X + X$ (fast)
- (ii) $X + Y_2 \rightleftharpoons XY + Y$ (slow)
- (iii) $X + Y \rightarrow XY$ (fast)

The overall order of the reaction will be

- (1) 1
- (2) 2
- (3) 0
- (4) 1.5

Answer (4)

Sol. The solution of this question is given by assuming step (i) to be reversible which is not given in question

$$\begin{aligned} \text{Overall rate} &= \text{Rate of slowest step (ii)} \\ &= k[X][Y_2] \quad \dots(1) \end{aligned}$$

k = rate constant of step (ii)

Assuming step (i) to be reversible, its equilibrium constant,

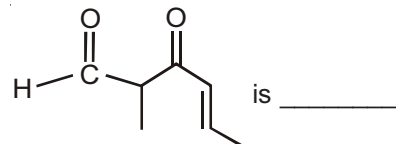
$$k_{eq} = \frac{[X]^2}{[X_2]} \Rightarrow [X] = k_{eq}^{1/2} [X_2]^{1/2} \quad \dots(2)$$

Put (2) in (1)

$$\text{Rate} = k k_{eq}^{1/2} [X_2]^{1/2} [Y_2]$$

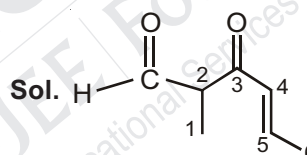
$$\text{Overall order} = \frac{1}{2} + 1 = \frac{3}{2}$$

89. The IUPAC name of the compound



- (1) 3-keto-2-methylhex-4-enal
- (2) 5-formylhex-2-en-3-one
- (3) 5-methyl-4-oxohex-2-en-5-al
- (4) 3-keto-2-methylhex-5-enal

Answer (1)



Aldehydes get higher priority over ketone and alkene in numbering of principal C-chain.

\therefore 3-keto-2-methylhex-4-enal

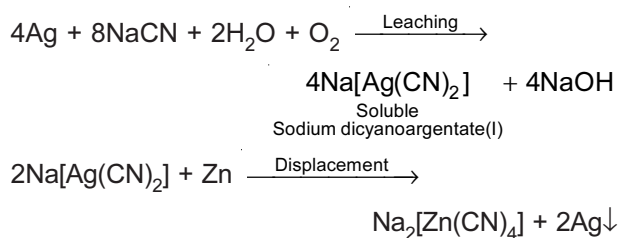
90. Extraction of gold and silver involves leaching with CN^- ion. Silver is later recovered by

- (1) Liquefaction
- (2) Distillation
- (3) Zone refining
- (4) Displacement with Zn

Answer (4)

Sol. Zn being more reactive than Ag and Au, displaces them.

From Native ore,



91. Double fertilization is exhibited by
- (1) Gymnosperms (2) Algae
(3) Fungi (4) Angiosperms

Answer (4)

Sol. Double fertilization is a characteristic feature exhibited by angiosperms. It involves syngamy and triple fusion.

92. Which of the following are found in extreme saline conditions?
- (1) Archaeobacteria
(2) Eubacteria
(3) Cyanobacteria
(4) Mycobacteria

Answer (1)

Sol. Archaeobacteria are able to survive in harsh conditions because of branched lipid chain in cell membrane which reduces fluidity of cell membrane.

Halophiles are exclusively found in saline habitats.

93. Select the mismatch :
- (1) *Frankia* – *Alnus*
(2) *Rhodospirillum* – *Mycorrhiza*
(3) *Anabaena* – Nitrogen fixer
(4) *Rhizobium* – *Alfalfa*

Answer (2)

Sol. *Rhodospirillum* is anaerobic, free living nitrogen fixer. Mycorrhiza is a symbiotic relationship between fungi and roots of higher plants.

94. What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis?
- (1) The larger the fragment size, the farther it moves
(2) The smaller the fragment size, the farther it moves
(3) Positively charged fragments move to farther end
(4) Negatively charged fragments do not move

Answer (2)

Sol. During gel electrophoresis, DNA fragments separate (resolve) according to their size through sieving effect provided by agarose gel.

95. Attractants and rewards are required for
- (1) Anemophily
(2) Entomophily
(3) Hydrophily
(4) Cleistogamy

Answer (2)

Sol. Insect pollinated plants provide rewards as edible pollen grain and nectar as usual rewards. While some plants also provide safe place for deposition of eggs.

96. Which of the following is made up of dead cells?
- (1) Xylem parenchyma (2) Collenchyma
(3) Phellem (4) Phloem

Answer (3)

Sol. Cork cambium undergoes periclinal division and cuts off thick walled suberised dead cork cells towards outside and it cuts off thin walled living cells i.e., phelloderm on inner side.

97. Which cells of 'Crypts of Lieberkuhn' secrete antibacterial lysozyme?
- (1) Argentaffin cells (2) Paneth cells
(3) Zymogen cells (4) Kupffer cells

Answer (2)

Sol. – Kupffer-cells are phagocytic cells of liver.

- Zymogen cells are enzyme producing cells.
- Paneth cell secretes lysozyme which acts as anti-bacterial agent.
- Argentaffin cells are hormone producing cells.

98. Adult human RBCs are enucleate. Which of the following statement(s) is/are most appropriate explanation for this feature?

- (a) They do not need to reproduce
(b) They are somatic cells
(c) They do not metabolize
(d) All their internal space is available for oxygen transport
- (1) Only (d) (2) Only (a)
(3) (a), (c) and (d) (4) (b) and (c)

Answer (1)

Sol. In Human RBCs, nucleus degenerates during maturation which provide more space for oxygen carrying pigment (Haemoglobin). It lacks most of the cell organelles including mitochondria so respire anaerobically.

99. The hepatic portal vein drains blood to liver from
- (1) Heart
(2) Stomach
(3) Kidneys
(4) Intestine

Answer (4)

Sol. In hepatic portal system, hepatic portal vein carries maximum amount of nutrients from intestine to liver.

100. The final proof for DNA as the genetic material came from the experiments of

- (1) Griffith
- (2) Hershey and Chase
- (3) Avery, Mcleod and McCarty
- (4) Hargobind Khorana

Answer (2)

Sol. Hershey and Chase gave unequivocal proof which ended the debate between protein and DNA as genetic material.

101. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen?

- (1) *Bacillus*
- (2) *Pseudomonas*
- (3) *Mycoplasma*
- (4) *Nostoc*

Answer (3)

Sol. Mycoplasmas are smallest, wall-less prokaryotes, pleomorphic in nature. These are pathogenic on both plants and animals.

102. Which of the following options gives the correct sequence of events during mitosis?

- (1) Condensation → nuclear membrane disassembly → crossing over → segregation → telophase
- (2) Condensation → nuclear membrane disassembly → arrangement at equator → centromere division → segregation → telophase
- (3) Condensation → crossing over → nuclear membrane disassembly → segregation → telophase
- (4) Condensation → arrangement at equator → centromere division → segregation → telophase

Answer (2)

Sol. The correct sequence of events during mitosis would be as follows

- (i) Condensation of DNA so that chromosomes become visible occurs during early to mid-prophase.
- (ii) Nuclear membrane disassembly begins at late prophase or transition to metaphase.
- (iii) Arrangement of chromosomes at equator occurs during metaphase, called congression.
- (iv) Centromere division or splitting occurs during anaphase forming daughter chromosomes.

(v) Segregation also occurs during anaphase as daughter chromosomes separate and move to opposite poles.

(vi) Telophase leads to formation of two daughter nuclei.

103. Which one of the following statements is **correct**, with reference to enzymes?

- (1) Apoenzyme = Holoenzyme + Coenzyme
- (2) Holoenzyme = Apoenzyme + Coenzyme
- (3) Coenzyme = Apoenzyme + Holoenzyme
- (4) Holoenzyme = Coenzyme + Cofactor

Answer (2)

Sol. Holoenzyme is conjugated enzyme in which protein part is apoenzyme while non-protein is cofactor.

Coenzyme are also organic compounds but their association with apoenzyme is only transient and serve as cofactors.

104. During DNA replication, Okazaki fragments are used to elongate

- (1) The leading strand towards replication fork
- (2) The lagging strand towards replication fork
- (3) The leading strand away from replication fork
- (4) The lagging strand away from the replication fork

Answer (4)

Sol. Two DNA polymerase molecules work simultaneously at the DNA fork, one on the leading strand and the other on the lagging strand.

Each Okazaki fragment is synthesized by DNA polymerase at lagging strand in 5' → 3' direction. New Okazaki fragments appear as the replication fork opens further.

As the first Okazaki fragment appears away from the replication fork, the direction of elongation would be away from replication fork.

105. Which of the following are not polymeric?

- (1) Nucleic acids
- (2) Proteins
- (3) Polysaccharides
- (4) Lipids

Answer (4)

Sol. – Nucleic acids are polymers of nucleotides

– Proteins are polymers of amino acids

– Polysaccharides are polymers of monosaccharides

– Lipids are the esters of fatty acids and alcohol

106. The region of Biosphere Reserve which is legally protected and where no human activity is allowed is known as

- (1) Core zone (2) Buffer zone
 (3) Transition zone (4) Restoration zone

Answer (1)

Sol. Biosphere reserve is protected area with multipurpose activities.

It has three zones

- (a) Core zone – without any human interference
 (b) Buffer zone – with limited human activity
 (c) Transition zone – human settlement, grazing cultivation etc., are allowed.

107. A dioecious flowering plant prevents both:

- (1) Autogamy and xenogamy
 (2) Autogamy and geitonogamy
 (3) Geitonogamy and xenogamy
 (4) Cleistogamy and xenogamy

Answer (2)

Sol. When unisexual male and female flowers are present on different plants the condition is called dioecious and it prevents both autogamy and geitonogamy.

108. A temporary endocrine gland in the human body is

- (1) Pineal gland (2) Corpus cardiacum
 (3) Corpus luteum (4) Corpus allatum

Answer (3)

Sol. Corpus luteum is the temporary endocrine structure formed in the ovary after ovulation. It is responsible for the release of the hormones like progesterone, oestrogen etc.

109. Match the following sexually transmitted diseases (Column - I) with their causative agent (Column - II) and select the correct option.

Column - I

Column- II

- | | |
|-------------------|-----------------------------------|
| (a) Gonorrhoea | (i) HIV |
| (b) Syphilis | (ii) <i>Neisseria</i> |
| (c) Genital Warts | (iii) <i>Treponema</i> |
| (d) AIDS | (iv) <i>Human Papilloma virus</i> |

Options :

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

Answer (1)

Sol. Gonorrhoea – *Neisseria* (Bacteria)

Syphilis – *Treponema* (Bacteria)

Genital Warts – *Human papilloma virus* (Virus)

AIDS – HIV (Virus)

110. Transplantation of tissues/organs fails often due to non-acceptance by the patient's body. Which type of immune-response is responsible for such rejections?

- (1) Autoimmune response
 (2) Cell-mediated immune response
 (3) Hormonal immune response
 (4) Physiological immune response

Answer (2)

Sol. Non-acceptance or rejection of graft or transplanted tissues/organs is due to cell mediated immune response.

111. Spliceosomes are **not** found in cells of

- (1) Plants (2) Fungi
 (3) Animals (4) Bacteria

Answer (4)

Sol. Spliceosomes are used in removal of introns during post-transcriptional processing of hnRNA in eukaryotes only as split genes are absent as prokaryotes.

112. An example of colonial alga is

- (1) *Chlorella* (2) *Volvox*
 (3) *Ulothrix* (4) *Spirogyra*

Answer (2)

Sol. *Volvox* is motile colonial fresh water alga with definite number of vegetative cells.

113. Which of the following represents order of 'Horse'?

- (1) Equidae (2) Perissodactyla
 (3) Caballus (4) Ferus

Answer (2)

Sol. Horse belongs to order perissodactyla of class mammalia. Perissodactyla includes odd-toed mammals.

114. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?

- (1) Lysosome (2) Ribosome
 (3) Chloroplast (4) Mitochondrion

Answer (4)

Sol. Mitochondria are the site of aerobic oxidation of carbohydrates to generate ATP.

115. The process of separation and purification of expressed protein before marketing is called

- (1) Upstream processing
- (2) Downstream processing
- (3) Bioprocessing
- (4) Postproduction processing

Answer (2)

Sol. Biosynthetic stage for synthesis of product in recombinant DNA technology is called upstreaming process while after completion of biosynthetic stage, the product has to be subjected through a series of processes which include separation and purification are collectively referred to as downstreaming processing.

116. Mycorrhizae are the example of

- (1) Fungistasis
- (2) Amensalism
- (3) Antibiosis
- (4) Mutualism

Answer (4)

Sol. Mycorrhizae is a symbiotic association of fungi with roots of higher plants.

117. Viroids differ from viruses in having :

- (1) DNA molecules with protein coat
- (2) DNA molecules without protein coat
- (3) RNA molecules with protein coat
- (4) RNA molecules without protein coat

Answer (4)

Sol. Viroids are sub-viral agents as infectious RNA particles, without protein coat.

118. Root hairs develop from the region of

- (1) Maturation
- (2) Elongation
- (3) Root cap
- (4) Meristematic activity

Answer (1)

Sol. In roots, the root hairs arise from zone of maturation. This zone is differentiated zone thus bearing root hairs.

119. Coconut fruit is a

- (1) Drupe
- (2) Berry
- (3) Nut
- (4) Capsule

Answer (1)

Sol. Coconut fruit is a drupe. A drupe develops from monocarpellary superior ovary and are one seeded.

120. Plants which produce characteristic pneumatophores and show vivipary belong to

- (1) Mesophytes
- (2) Halophytes
- (3) Psammophytes
- (4) Hydrophytes

Answer (2)

Sol. Halophytes growing in saline soils show

- (i) Vivipary which is *in-situ* seed germination
- (ii) Pneumatophores for gaseous exchange

121. Which one of the following is related to *Ex-situ* conservation of threatened animals and plants?

- (1) Wildlife Safari parks
- (2) Biodiversity hot spots
- (3) Amazon rainforest
- (4) Himalayan region

Answer (1)

Sol. *Ex-situ* conservation is offsite strategy for conservation of animals and plants in zoological park and botanical gardens respectively.

122. Select the mismatch :

- (1) *Pinus* – Dioecious
- (2) *Cycas* – Dioecious
- (3) *Salvinia* – Heterosporous
- (4) *Equisetum* – Homosporous

Answer (1)

Sol. *Pinus* is monoecious plant having both male and female cones on same plant.

123. Which of the following facilitates opening of stomatal aperture?

- (1) Contraction of outer wall of guard cells
- (2) Decrease in turgidity of guard cells
- (3) Radial orientation of cellulose microfibrils in the cell wall of guard cells
- (4) Longitudinal orientation of cellulose microfibrils in the cell wall of guard cells

Answer (3)

Sol. Cellulose microfibrils are oriented radially rather than longitudinally which makes easy for the stoma to open.

124. The association of histone H1 with a nucleosome indicates:

- (1) Transcription is occurring
- (2) DNA replication is occurring
- (3) The DNA is condensed into a Chromatin Fibre
- (4) The DNA double helix is exposed

Answer (3)

Sol. The association of H1 protein indicates the complete formation of nucleosome.

Therefore the DNA is in condensed form.

125. DNA fragments are

- (1) Positively charged
- (2) Negatively charged
- (3) Neutral
- (4) Either positively or negatively charged depending on their size

Answer (2)

Sol. DNA fragments are negatively charged because of phosphate group.

126. Capacitation occurs in

- (1) Rete testis
- (2) Epididymis
- (3) Vas deferens
- (4) Female Reproductive tract

Answer (4)

Sol. Capacitation is increase in fertilising capacity of sperms which occurs in female reproductive tract.

127. Which ecosystem has the maximum biomass?

- (1) Forest ecosystem
- (2) Grassland ecosystem
- (3) Pond ecosystem
- (4) Lake ecosystem

Answer (1)

Sol. High productive ecosystem are

- Tropical rain forest
- Coral reef
- Estuaries
- Sugarcane fields

128. A disease caused by an autosomal primary non-disjunction is

- (1) Down's syndrome
- (2) Klinefelter's syndrome
- (3) Turner's syndrome
- (4) Sickle cell anemia

Answer (1)

Sol. Down's syndrome is caused by non-disjunction of 21st chromosome.

129. Life cycle of *Ectocarpus* and *Fucus* respectively are

- (1) Haplontic, Diplontic
- (2) Diplontic, Haplodiplontic
- (3) Haplodiplontic, Diplontic
- (4) Haplodiplontic, Haplontic

Answer (3)

Sol. *Ectocarpus* has haplodiplontic life cycle and *Fucus* has diplontic life cycle.

130. If there are 999 bases in an RNA that codes for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered?

- (1) 1
- (2) 11
- (3) 33
- (4) 333

Answer (3)

Sol. If deletion occurs at 901st position the remaining 98 bases specifying for 33 codons of amino acids will be altered.

131. The pivot joint between atlas and axis is a type of

- (1) Fibrous joint
- (2) Cartilaginous joint
- (3) Synovial joint
- (4) Saddle joint

Answer (3)

Sol. Synovial joints are freely movable joint which allow considerable movements. Pivot joint is a type of synovial joint which provide rotational movement as in between atlas and axis vertebrae of vertebral column.

132. A gene whose expression helps to identify transformed cell is known as

- (1) Selectable marker
- (2) Vector
- (3) Plasmid
- (4) Structural gene

Answer (1)

Sol. In recombinant DNA technology, selectable markers helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants.

133. Presence of plants arranged into well defined vertical layers depending on their height can be seen best in :

- (1) Tropical Savannah
- (2) Tropical Rain Forest
- (3) Grassland
- (4) Temperate Forest

Answer (2)

Sol. The tropical rain forest have five vertical strata on the basis of height of plants. *i.e.*, ground vegetation, shrubs, short canopy trees, tall canopy trees and tall emergent trees.

134. The genotypes of a Husband and Wife are I^AI^B and I^Ai.

Among the blood types of their children, how many different genotypes and phenotypes are possible?

- (1) 3 genotypes ; 3 phenotypes
- (2) 3 genotypes ; 4 phenotypes
- (3) 4 genotypes ; 3 phenotypes
- (4) 4 genotypes ; 4 phenotypes

Answer (3)

Sol. Husband \times Wife

$I^A I^B$	I^A	I^B
$I^A i$	$I^A I^A$	$I^A I^B$
$I^B i$	$I^A I^B$	$I^B I^B$

Number of genotypes = 4

Number of phenotypes = 3

$I^A I^A$ and $I^A i$ = A

$I^A I^B$ = AB

$I^B i$ = B

135. Zygotic meiosis is characteristic of

- (1) *Marchantia* (2) *Fucus*
(3) *Funaria* (4) *Chlamydomonas*

Answer (4)

Sol. *Chlamydomonas* has haplontic life cycle hence showing zygotic meiosis or initial meiosis.

136. Which of the following is correctly matched for the product produced by them?

- (1) *Acetobacter aceti* : Antibiotics
(2) *Methanobacterium* : Lactic acid
(3) *Penicillium notatum* : Acetic acid
(4) *Saccharomyces cerevisiae* : Ethanol

Answer (4)

Sol. *Saccharomyces cerevisiae* is commonly called Brewer's yeast. It causes fermentation of carbohydrates producing ethanol.

137. Frog's heart when taken out of the body continues to beat for some time

Select the best option from the following statements

- (a) Frog is a poikilotherm
(b) Frog does not have any coronary circulation
(c) Heart is "myogenic" in nature
(d) Heart is autoexcitable

Options

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

Answer (4)

Sol. Frog or the vertebrates have myogenic heart having self contractile system or are autoexcitable; because of this condition, it will keep on working outside the body for some time.

138. Which statement is wrong for Krebs' cycle?

- (1) There are three points in the cycle where NAD^+ is reduced to $NADH + H^+$
(2) There is one point in the cycle where FAD^+ is reduced to $FADH_2$
(3) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised
(4) The cycle starts with condensation of acetyl group (acetyl CoA) with pyruvic acid to yield citric acid

Answer (4)

Sol. Krebs cycle starts with condensation of acetyl CoA (2C) with oxaloacetic acid (4C) to form citric acid (6C).

139. In case of poriferans the spongocoel is lined with flagellated cells called :

- (1) Ostia
(2) Oscula
(3) Choanocytes
(4) Mesenchymal cells

Answer (3)

Sol. Choanocytes (collar cells) form lining of spongocoel in poriferans (sponges). Flagella in collar cells provide circulation to water in water canal system.

140. Which of the following RNAs should be most abundant in animal cell?

- (1) r-RNA
(2) t-RNA
(3) m-RNA
(4) mi-RNA

Answer (1)

Sol. rRNA is most abundant in animal cell. It constitutes 80% of total RNA of the cell.

141. Which among these is the correct combination of aquatic mammals?

- (1) Seals, Dolphins, Sharks
(2) Dolphins, Seals, Trygon
(3) Whales, Dolphins, Seals
(4) Trygon, Whales, Seals

Answer (3)

Sol. Sharks and Trygon (sting ray) are the members of chondrichthyes (cartilaginous fish) while whale, Dolphin and Seals are aquatic mammals belong to class mammalia.

142. With reference to factors affecting the rate of photosynthesis, which of the following statements is **not** correct?

- (1) Light saturation for CO₂ fixation occurs at 10% of full sunlight
- (2) Increasing atmospheric CO₂ concentration upto 0.05% can enhance CO₂ fixation rate
- (3) C₃ plants responds to higher temperatures with enhanced photosynthesis while C₄ plants have much lower temperature optimum
- (4) Tomato is a greenhouse crop which can be grown in CO₂ - enriched atmosphere for higher yield

Answer (3)

Sol. In C₃ plants photosynthesis is decreased at higher temperature due to increased photorespiration.

C₄ plants have higher temperature optimum because of the presence of pyruvate phosphate dikinase enzyme, which is sensitive to low temperature.

143. Asymptote in a logistic growth curve is obtained when

- (1) The value of 'r' approaches zero
- (2) K = N
- (3) K > N
- (4) K < N

Answer (2)

Sol. A population growing in a habitat with limited resources shows logistic growth curve.

For logistic growth

$$\frac{dN}{dt} = rN \left(\frac{K - N}{K} \right)$$

$$\text{If } K = N \text{ then } \frac{K - N}{K} = 0$$

$$\therefore \text{the } \frac{dN}{dt} = 0,$$

the population reaches asymptote.

144. Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation :

- (1) X = 12, Y = 7 True ribs are attached dorsally to vertebral column and ventrally to the sternum
- (2) X = 12, Y = 5 True ribs are attached dorsally to vertebral column and sternum on the two ends

(3) X = 24, Y = 7

True ribs are dorsally attached to vertebral column but are free on ventral side

(4) X = 24, Y = 12

True ribs are dorsally attached to vertebral column but are free on ventral side

Answer (1)

Sol. In human, 12 pairs of ribs are present in which 7 pairs of ribs (1st to 7th pairs) are attached dorsally to vertebral column and ventrally to the sternum.

145. The DNA fragments separated on an agarose gel can be visualised after staining with

- (1) Bromophenol blue
- (2) Acetocarmine
- (3) Aniline blue
- (4) Ethidium bromide

Answer (4)

Sol. Ethidium bromide is used to stain the DNA fragments and will appear as orange coloured bands under UV light.

146. Functional megaspore in an angiosperm develops into

- (1) Ovule
- (2) Endosperm
- (3) Embryo sac
- (4) Embryo

Answer (3)

Sol. Megaspore is the first cell of female gametophytic generation in angiosperm. It undergoes three successive generations of free nuclear mitosis to form 8-nucleated and 7-celled embryo sac.

147. Among the following characters, which one was not considered by Mendel in his experiments on pea?

- (1) Stem – Tall or Dwarf
- (2) Trichomes – Glandular or non-glandular
- (3) Seed – Green or Yellow
- (4) Pod – Inflated or Constricted

Answer (2)

Sol. During his experiments Mendel studied seven characters.

Nature of trichomes *i.e.*, glandular or non-glandular was not considered by Mendel.

148. Lungs are made up of air-filled sacs the alveoli. They do not collapse even after forceful expiration, because of :

- (1) Residual Volume
- (2) Inspiratory Reserve Volume
- (3) Tidal Volume
- (4) Expiratory Reserve Volume

Answer (1)

Sol. Volume of air present in lungs after forceful expiration as residual volume which prevents the collapsing of alveoli even after forceful expiration.

149. GnRH, a hypothalamic hormone, needed in reproduction, acts on

- (1) Anterior pituitary gland and stimulates secretion of LH and oxytocin
- (2) Anterior pituitary gland and stimulates secretion of LH and FSH
- (3) Posterior pituitary gland and stimulates secretion of oxytocin and FSH
- (4) Posterior pituitary gland and stimulates secretion of LH and relaxin

Answer (2)

Sol. Hypothalamus secretes GnRH which stimulates anterior pituitary gland for the secretion of gonadotropins (FSH and LH).

150. In *Bougainvillea* thorns are the modifications of

- (1) Stipules
- (2) Adventitious root
- (3) Stem
- (4) Leaf

Answer (3)

Sol. Thorns are hard, pointed straight structures for protection. These are modified stem

151. Which one from those given below is the period for Mendel's hybridization experiments?

- (1) 1856 - 1863
- (2) 1840 - 1850
- (3) 1857 - 1869
- (4) 1870 - 1877

Answer (1)

Sol. Mendel conducted hybridization experiments on Pea plant for 7 years between 1856 to 1863 and his data was published in 1865 (according to NCERT).

152. Good vision depends on adequate intake of carotene rich food

Select the best option from the following statements

- (a) Vitamin A derivatives are formed from carotene
- (b) The photopigments are embedded in the membrane discs of the inner segment

(c) Retinal is a derivative of vitamin A

(d) Retinal is a light absorbing part of all the visual photopigments

- (1) (a) & (b)
- (2) (a), (c) & (d)
- (3) (a) & (c)
- (d) (b), (c) & (d)

Answer (2)

Sol. Carotene is the source of retinal which is involved in formation of rhodopsin of rod cells. Retinal, a derivative of vitamin A, is the light-absorbing part of all visual photopigments.

153. Which one of the following statements is not valid for aerosols?

- (1) They are harmful to human health
- (2) They alter rainfall and monsoon patterns
- (3) They cause increased agricultural productivity
- (4) They have negative impact on agricultural land

Answer (3)

Sol. Aerosols can cause various problems to agriculture through its direct or indirect effects on plants. However continually increasing air pollution may represent a persistent and largely irreversible threat to agriculture in the future.

154. A decrease in blood pressure/volume will not cause the release of

- (1) Renin
- (2) Atrial Natriuretic Factor
- (3) Aldosterone
- (4) ADH

Answer (2)

Sol. A decrease in blood pressure / volume stimulates the release of renin, aldosterone, and ADH while increase in blood pressure / volume stimulates the release of Atrial Natriuretic Factor (ANF) which cause vasodilation and also inhibits RAAS (Renin Angiotensin Aldosterone System) mechanism that decreases the blood volume/pressure.

155. Homozygous purelines in cattle can be obtained by

- (1) mating of related individuals of same breed
- (2) mating of unrelated individuals of same breed
- (3) mating of individuals of different breed
- (4) mating of individuals of different species

Answer (1)

Sol. Inbreeding results in increase in the homozygosity. Therefore, mating of the related individuals of same breed will increase homozygosity.

156. The vascular cambium normally gives rise to

- (1) Phelloderm (2) Primary phloem
(3) Secondary xylem (4) Periderm

Answer (3)

Sol. During secondary growth, vascular cambium gives rise to secondary xylem and secondary phloem. Phelloderm is formed by cork cambium.

157. Which of the following statements is correct?

- (1) The ascending limb of loop of Henle is impermeable to water
(2) The descending limb of loop of Henle is impermeable to water
(3) The ascending limb of loop of Henle is permeable to water
(4) The descending limb of loop of Henle is permeable to electrolytes

Answer (1)

Sol. Descending limb of loop of Henle is permeable to water but impermeable to electrolytes while ascending limb is impermeable to water but permeable to electrolytes.

158. Fruit and leaf drop at early stages can be prevented by the application of

- (1) Cytokinins (2) Ethylene
(3) Auxins (4) Gibberellic acid

Answer (3)

Sol. Auxins prevent premature leaf and fruit fall.

NAA prevents fruit drop in tomato; 2,4-D prevents fruit drop in *Citrus*.

159. A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent?

- (1) Incisors (2) Canines
(3) Pre-molars (4) Molars

Answer (3)

Sol. Total number of teeth in human child = 20. Premolars are absent in primary dentition.

160. An important characteristic that Hemichordates share with Chordates is

- (1) Absence of notochord
(2) Ventral tubular nerve cord
(3) Pharynx with gill slits
(4) Pharynx without gill slits

Answer (3)

Sol. Pharyngeal gill slits are present in hemichordates as well as in chordates. Notochord is present in chordates only. Ventral tubular nerve cord is characteristic feature of non-chordates.

161. Artificial selection to obtain cows yielding higher milk output represents

- (1) Stabilizing selection as it stabilizes this character in the population
(2) Directional as it pushes the mean of the character in one direction
(3) Disruptive as it splits the population into two one yielding higher output and the other lower output
(4) Stabilizing followed by disruptive as it stabilizes the population to produce higher yielding cows

Answer (2)

Sol. Artificial selection to obtain cow yielding higher milk output will shift the peak to one direction, hence, will be an example of Directional selection. In stabilizing selection, the organisms with the mean value of the trait are selected. In disruptive selection, both extremes get selected.

162. Select the **correct** route for the passage of sperms in male frogs :

- (1) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca
(2) Testes → Vasa efferentia → Kidney → Seminal Vesicle → Urinogenital duct → Cloaca
(3) Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca
(4) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca

Answer (4)

Sol. In male frog the sperms will move from

Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca.

163. Which of the following options best represents the enzyme composition of pancreatic juice?

- (1) Amylase, peptidase, trypsinogen, rennin
(2) Amylase, pepsin, trypsinogen, maltase
(3) Peptidase, amylase, pepsin, rennin
(4) Lipase, amylase, trypsinogen, procarboxypeptidase

Answer (4)

Sol. Rennin and Pepsin enzymes are present in the gastric juice. Maltase is present in the intestinal juice.

164. Phosphoenol pyruvate (PEP) is the primary CO_2 acceptor in :

- (1) C_3 plants (2) C_4 plants
(3) C_2 plants (4) C_3 and C_4 plants

Answer (2)

Sol. PEP is 3C compound which serves as primary CO_2 acceptor in the mesophyll cell cytoplasm of C_4 plants like maize, sugarcane, *Sorghum* etc.

165. The morphological nature of the edible part of coconut is

- (1) Perisperm (2) Cotyledon
(3) Endosperm (4) Pericarp

Answer (3)

Sol. Coconut has double endosperm with liquid endosperm and cellular endosperm.

166. Anaphase promoting complex (APC) is a protein degradation machinery necessary for proper mitosis of animal cells. If APC is defective in a human cell, which of the following is expected to occur?

- (1) Chromosomes will not condense
(2) Chromosomes will be fragmented
(3) Chromosomes will not segregate
(4) Recombination of chromosome arms will occur

Answer (3)

Sol. Anaphase Promoting Complex (APC) is a protein necessary for separation of daughter chromosomes during anaphase. If APC is defective then the chromosomes will fail to segregate during anaphase.

167. MALT constitutes about _____ percent of the lymphoid tissue in human body.

- (1) 50% (2) 20%
(3) 70% (4) 10%

Answer (1)

Sol. MALT is Mucosa Associated Lymphoid Tissue and it constitutes about 50 percent of the lymphoid tissue in human body.

168. Receptor sites for neurotransmitters are present on

- (1) Membranes of synaptic vesicles
(2) Pre-synaptic membrane
(3) Tips of axons
(4) Post-synaptic membrane

Answer (4)

Sol. Pre-synaptic membrane is involved in the release of neurotransmitter in the chemical synapse. The receptors sites for neurotransmitters are present on post-synaptic membrane.

169. Hypersecretion of Growth Hormone in adults does not cause further increase in height, because

- (1) Growth Hormone becomes inactive in adults
(2) Epiphyseal plates close after adolescence
(3) Bones loose their sensitivity to Growth Hormone in adults
(4) Muscle fibres do not grow in size after birth

Answer (2)

Sol. Epiphyseal plate is responsible for the growth of bone which close after adolescence so hypersecretion of growth hormone in adults does not cause further increase in height.

170. Alexander Von Humbolt described for the first time

- (1) Ecological Biodiversity
(2) Laws of limiting factor
(3) Species area relationships
(4) Population Growth equation

Answer (3)

Sol. Alexander Von Humboldt observed that within a region species richness increases with the increases in area.

171. Myelin sheath is produced by

- (1) Schwann Cells and Oligodendrocytes
(2) Astrocytes and Schwann Cells
(3) Oligodendrocytes and Osteoclasts
(4) Osteoclasts and Astrocytes

Answer (1)

Sol. Oligodendrocytes are neuroglial cells which produce myelin sheath in central nervous system while Schwann cell produces myelin sheath in peripheral nervous system.

172. In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation?

- (1) Intrauterine transfer
(2) Gamete intracytoplasmic fallopian transfer
(3) Artificial Insemination
(4) Intracytoplasmic sperm injection

Answer (3)

Sol. Infertility cases due to inability of the male partner to inseminate the female or due to very low sperm count in the ejaculates, could be corrected by artificial insemination (AI).

173. Which of the following components provides sticky character to the bacterial cell?

- (1) Cell wall (2) Nuclear membrane
(3) Plasma membrane (4) Glycocalyx

Answer (4)

Sol. Sticky character of the bacterial wall is due to glycocalyx or slime layer. This layer is rich in glycoproteins.

174. DNA replication in bacteria occurs

- (1) During S-phase
(2) Within nucleolus
(3) Prior to fission
(4) Just before transcription

Answer (3)

Sol. DNA replication in bacteria occurs prior to fission. Prokaryotes do not show well marked S-phase due to their primitive nature.

175. The function of copper ions in copper releasing IUD's is :

- (1) They suppress sperm motility and fertilising capacity of sperms
(2) They inhibit gametogenesis
(3) They make uterus unsuitable for implantation
(4) They inhibit ovulation

Answer (1)

Sol. Cu^{2+} interfere in the sperm movement, hence suppress the sperm motility and fertilising capacity of sperms.

176. Which of the following in sewage treatment removes suspended solids?

- (1) Tertiary treatment (2) Secondary treatment
(3) Primary treatment (4) Sludge treatment

Answer (3)

Sol. Primary treatment is a physical process which involves sequential filtration and sedimentation.

177. The water potential of pure water is

- (1) Zero
(2) Less than zero
(3) More than zero but less than one
(4) More than one

Answer (1)

Sol. By convention, the water potential of pure water at standard temperature, which is not under any pressure, is taken to be zero.

178. Identify the wrong statement in context of heartwood.

- (1) Organic compounds are deposited in it
(2) It is highly durable
(3) It conducts water and minerals efficiently
(4) It comprises dead elements with highly lignified walls

Answer (3)

Sol. Heartwood is physiologically inactive due to deposition of organic compounds and tyloses formation, so this will not conduct water and minerals.

179. Thalassaemia and sickle cell anemia are caused due to a problem in globin molecule synthesis. Select the correct statement.

- (1) Both are due to a qualitative defect in globin chain synthesis
(2) Both are due to a quantitative defect in globin chain synthesis
(3) Thalassaemia is due to less synthesis of globin molecules
(4) Sickle cell anemia is due to a quantitative problem of globin molecules

Answer (3)

Sol. Thalassaemia differs from sickle-cell anaemia in that the former is a quantitative problem of synthesising too few globin molecules while the latter is a qualitative problem of synthesising an incorrectly functioning globin.

180. Flowers which have single ovule in the ovary and are packed into inflorescence are usually pollinated by

- (1) Water
(2) Bee
(3) Wind
(4) Bat

Answer (3)

Sol. Wind pollination or anemophily is favoured by flowers having a single ovule in each ovary, and numerous flowers packed in an inflorescence. Wind pollination is a non-directional pollination.