All India Aakash Test Series for NEET - 2020

TEST - 7 (Code-A)

Test Date : 19/01/2020

ANSWERS

1. (4)	37. (2)	73. (3)	109. (2)	145. (2)
2. (3)	38. (1)	74. (3)	110. (4)	146. (3)
3. (2)	39. (3)	75. (3)	111. (2)	147. (4)
4. (1)	40. (1)	76. (3)	112. (4)	148. (2)
5. (2)	41. (2)	77. (2)	113. (3)	149. (1)
6. (3)	42. (4)	78. (4)	114. (1)	150. (1)
7. (4)	43. (1)	79. (3)	115. (3)	151. (2)
8. (3)	44. (2)	80. (4)	116. (2)	152. (1)
9. (2)	45. (4)	81. (2)	117. (4)	153. (3)
10. (1)	46. (2)	82. (3)	118. (3)	154. (2)
11. (3)	47. (4)	83. (2)	119. (4)	155. (3)
12. (4)	48. (2)	84. (1)	120. (1)	156. (1)
13. (1)	49. (2)	85. (3)	121. (3)	157. (4)
14. (3)	50. (3)	86. (2)	122. (2)	158. (2)
15. (1)	51. (3)	87. (1)	123. (3)	159. (1)
16. (3)	52. (1)	88. (4)	124. (2)	160. (2)
17. (2)	53. (3)	89. (3)	125. (2)	161. (4)
18. (2)	54. (4)	90. (1)	126. (1)	162. (4)
19. (4)	55. (3)	91. (3)	127. (4)	163. (1)
20. (1)	56. (3)	92. (3)	128. (1)	164. (2)
21. (2)	57. (3)	93. (2)	129. (3)	165. (3)
22. (4)	58. (4)	94. (4)	130. (2)	166. (2)
23. (1)	59. (2)	95. (2)	131. (3)	167. (3)
24. (1)	60. (3)	96. (3)	132. (4)	168. (4)
25. (2)	61. (4)	97. (1)	133. (4)	169. (1)
26. (2)	62. (3)	98. (4)	134. (3)	170. (1)
27. (4)	63. (2)	99. (2)	135. (3)	171. (2)
28. (2)	64. (2)	100. (4)	136. (4)	172. (3)
29. (3)	65. (2)	101. (1)	137. (2)	173. (1)
30. (2)	66. (4)	102. (3)	138. (1)	174. (1)
31. (1)	67. (1)	103. (4)	139. (2)	175. (1)
32. (4)	68. (3)	104. (2)	140. (1)	176. (2)
33. (3)	69. (1)	105. (3)	141. (2)	177. (3)
34. (1)	70. (3)	106. (2)	142. (3)	178. (1)
35. (2)	71. (1)	107. (1)	143. (4)	179. (1)
36. (3)	72. (4)	108. (1)	144. (4)	180. (2)

HINTS & SOLUTIONS

[PHYSICS]

1. Answer (4)

Hint : Newton's law of gravitation.

Sol. : $F = \frac{Gm^2}{r^2}$

$$F' = \frac{G(2m)\left(\frac{m}{2}\right)}{r'^2} = \frac{Gm^2}{r'^2}$$

$$\frac{F}{2} = \frac{Gm^2}{r'^2}$$

$$\frac{Gm^2}{2r^2} = \frac{Gm^2}{r'^2}$$

$$r' = \sqrt{2}\, r$$

2. Answer (3)

Hint : According to Kepler's law,

$T^2 \propto R^3$

Sol. : $\frac{T_1}{T_2} = \left(\frac{R_1}{R_2}\right)^{\frac{3}{2}}$

$$\frac{T_1}{T_2} = \left(\frac{3R}{9R}\right)^{\frac{3}{2}} = \left(\frac{1}{3}\right)^{\frac{3}{2}}$$

$$T_2 = 3\sqrt{3}\, T$$

3. Answer (2)

Hint : Variation in value of g due to height.

Sol. : $W = mg = m \cdot \frac{GM}{R^2}$

$$W' = mg' = m\frac{GM}{(R+h)^2}$$

$$\frac{W}{W'} = \left(\frac{R+h}{R}\right)^2$$

$$\frac{1}{0.64} = \left(\frac{R+h}{R}\right)^2$$

$$\frac{R+h}{R} = \frac{1}{0.8}$$

$8R + 8h = 10R$

$$h = \frac{2R}{8} = \frac{R}{4}$$

4. Answer (1)

Hint : Use $\Delta U = U_f - U_i$

Sol. : $\Delta U = -\frac{GMm}{5R} - \left(-\frac{GMm}{3R}\right)$

$$= \frac{GMm}{15R}(5-3) = \frac{2GMm}{15R}$$

5. Answer (2)

Hint : $v_e = \sqrt{\frac{2GM}{R}}$

Sol. : $\frac{v_{e_1}}{v_{e_2}} = \sqrt{\frac{M_1}{M_2} \cdot \frac{R_2}{R_1}} = \sqrt{\frac{3}{2} \times \frac{6}{5}} = \sqrt{\frac{18}{10}}$

$$= \frac{3}{\sqrt{5}}$$

6. Answer (3)

Hint and Sol. : Gravitational force between two masses does not depend on medium between them.

7. Answer (4)

Hint : $\vec{E} = -\frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$

Sol. : $\vec{E}_x = -\frac{\partial V}{\partial x}\hat{i} = -\frac{\partial}{\partial x}\left(\frac{x}{x^2+4}\right)\hat{i}$, $\vec{E}_y = 0$, $\vec{E}_z = 0$

$$= -\left[\frac{x^2+4-x(2x)}{(x^2+4)^2}\right]\hat{i} = \frac{x^2-4}{(x^2+4)^2}\hat{i}$$

$$\vec{E}(x=2) = \frac{4-4}{(4+4)^2} = 0$$

8. Answer (3)

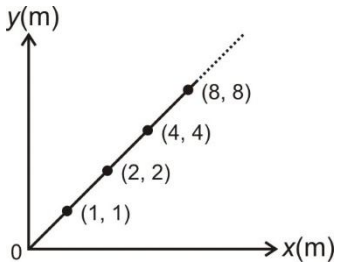
Hint and Sol. : The effective radius of earth on pole is smaller than at equator. Hence value of g at poles is larger than at equator. Also, the value of g from poles to equator decreases due to rotation of earth.

9. Answer (2)

Hint : $V_{net} = V_1 + V_2 + V_3 + \cdots$

$$V_i = -\frac{GM_i}{r_i}$$

Sol. :



$$V_0 = -GM\left[\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}+\cdots\right]$$

$$V_0 = -G\left[\frac{1}{\sqrt{2}}+\frac{1}{2\sqrt{2}}+\frac{1}{4\sqrt{2}}+\cdots\right.$$

$$= -\frac{G}{\sqrt{2}}\left[1+\frac{1}{2}+\frac{1}{4}+\cdots\right.$$

$$= -\frac{G}{\sqrt{2}}\left(\frac{1}{1-\frac{1}{2}}\right)$$

$$= -G\sqrt{2}$$

10. Answer (1)

Hint : Total energy of satellite in an orbit $= -\frac{GMm}{2r}$

Sol. : $E_1 = -\frac{GMm}{2R}$

$$E_2 = -\frac{GMm}{2(2R)} = -\frac{GmM}{4R}$$

$$\Delta E = -\frac{GMm}{4R} - \left(-\frac{GMm}{2R}\right) = +\frac{GMm}{4R}$$

11. Answer (3)

Hint : $\vec{E}_G = -\frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$

Sol. : $E_x = -\frac{\partial V}{\partial x}$

$= 2xy + z^2y$

$$E_y = -\frac{\partial V}{\partial y} = x^2 + z^3 + xz^2$$

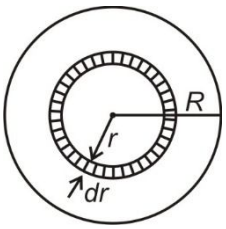
$$E_z = -\frac{\partial V}{\partial z} = 3yz^2 + 2xyz$$

$$\vec{E}_{G(1,1,0)} = \left(2\hat{i} + \hat{j}\right) \text{ N/kg}$$

12. Answer (4)

Hint : $E = \frac{G\int dm}{r^2}$

Sol. :



$dm = \rho 4\pi r^2 dr$

$= \rho_0 r \cdot 4\pi r^2 dr$

$M = \rho_0 \pi r^4$

For inside points ($r < R$)

$$E = -\frac{GM}{r^2} = -\frac{G\rho_0\pi r^4}{r^2}$$

$|E| \propto r^2$ for $r < R$

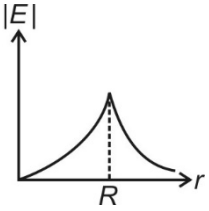
For outside ($r > R$)

$M = \rho_0 \pi R^4$

$$E = -\frac{G\rho_0\pi R^4}{r^2}$$

$$E \propto \frac{1}{r^2} \text{ for } r \geq R$$

Hence appropriate graph is



13. Answer (1)

Hint and Sol. : Maximum load depends on material and cross-sectional area of the wire.

14. Answer (3)

Hint : $U = \frac{1}{2}F \cdot \Delta\ell$

Sol. : $U = \frac{1}{2}\times 100 \times 10^{-3}$

$= 5 \times 10^{-2}$ J

15. Answer (1)

Hint : $\left|\frac{\Delta V}{V}\right| = \frac{P}{B}$ and $P = \rho gh$

Sol. : $P = \rho gh = 2800 \times 1000 \times 10$

$= 2.8 \times 10^7$ N/m^2

Fractional compression $\frac{\Delta V}{V} = \frac{P}{B} = \frac{2.8\times 10^7}{2.2\times 10^9}$

$= 1.27 \times 10^{-2}$

16. Answer (3)

Hint : Buoyant force = $\rho_w Vg$

Sol. : Let σ is the density of solid and ρ is density of water.

$W_1 = \sigma Vg$

$W_2 = (\sigma - \rho)Vg$

$$\frac{W_1}{W_2} = \frac{\sigma}{\sigma - \rho}$$

$$\frac{12}{8} = \frac{\sigma}{\sigma - \rho}$$

$12\sigma - 12\rho = 8\sigma$

$4\sigma = 12\rho$

$$\frac{\sigma}{\rho} = 3$$

17. Answer (2)

Hint and Sol. : If the angle of contact is obtuse for an interface then meniscus formed will be convex.

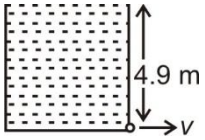
18. Answer (2)

Hint and Sol. : For a streamline flow of a liquid velocity of each particle at a particular position is constant.

19. Answer (4)

Hint : Use Bernoulli's principle.

Sol. :



$$P_0 + \rho gh = P_0 + \frac{1}{2}\rho v^2$$

$$v = \sqrt{2gh}$$

$= \sqrt{2 \times 9.8 \times 4.9}$

= 9.8 m/s

Rate of flow of water = $Av = 10^{-6} \times 9.8$

$= 9.8 \times 10^{-6}$ m^3/s

= 9.8 cm^3/s

20. Answer (1)

Hint : $\rho_{mix} = \frac{\rho_1 + \rho_2}{2}$ for equal volume

$\rho_{mix} = \frac{2\rho_1\rho_2}{\rho_1 + \rho_2}$ for equal mass

Sol. : $\frac{\rho_1 + \rho_2}{2} = 4.5$

$\rho_1 + \rho_2 = 9$ ...(i)

$$\frac{2\rho_1\rho_2}{\rho_1 + \rho_2} = 4$$

$\rho_1\rho_2 = 18$ ...(ii)

solving (i) and (ii)

$\rho_1 = 6$, $\rho_2 = 3$

21. Answer (2)

Hint : Work done in breaking a drop of radius R in n drops of equal size is, $W = T\Delta A = 4\pi R^2 T(n^{1/3} - 1)$

Sol. : $W = 4\pi R^2 T \cdot (27^{1/3} - 1)$

$= 8\pi R^2 T$

22. Answer (4)

Hint : Use excess pressure due to surface tension.

Sol. : Given vapour pressure $P = 2.33 \times 10^3$ Pa

Surface tension $S = 7.28 \times 10^{-2}$ N/m

The drop will evaporate if water pressure is greater than the vapour pressure.

Let R is radius of water droplet formed, then

$$P = \frac{2S}{R}$$

$$R = \frac{2S}{P} = \frac{2 \times 7.28 \times 10^{-2}}{2.33 \times 10^3}$$

$= 6.25 \times 10^{-5}$ m

= 62.5 μm

23. Answer (1)

Hint : Use thermal expansion and angular momentum conservation.

Sol. : As temperature decreases $\Rightarrow$ length of rod decreases $\Rightarrow$ moment of inertia decreases

Hence, from $I_1\omega_1 = I_2\omega_2$

$\Rightarrow$ Angular velocity increases.

24. Answer (1)

Hint : Anomalous expansion of water.

Sol. : Density of water is maximum at 4°C.

$F_B = \rho Vg$

$F_B \propto \rho$ ($\because$ V is constant)

$F_{4°C} > F_{0°C}$ because $\rho_{4°C} > \rho_{0°C}$

25. Answer (2)

Hint : $\Delta V = V\gamma\Delta T$

Sol. : Since $\gamma = 3\alpha$

$$\Delta V = \gamma V \cdot \Delta T = 3\alpha \cdot \frac{4}{3}\pi R^3 \cdot \Delta T$$

$= 4\pi R^3 \alpha \Delta T$

26. Answer (2)

Hint : For series combination.

$R_{Th} = R_{Th_1} + R_{Th_2} + \cdots$

Where $R_{Th} = \frac{L}{KA}$

Sol. : $\frac{2L}{K_{eq}A} = \frac{L}{2KA} + \frac{L}{3KA}$

$K_{eq} = \frac{2 \times 2K \times 3K}{5} = \frac{12}{5}K = 2.4\,K$

27. Answer (4)

Hint : Use heat loss = Heat gain.

Sol. : Heat released by steam in conversion of 100°C steam to 100°C water = 5 × 540 = 2700 cal.

Heat required to convert ice at 0°C to water at 0°C = 5 × 80 = 400 cal

Heat required to increase temperature of 5 g water from 0°C to 100°C = 5 × 1 × 100 = 500 cal.

Total heat required < Heat released

Hence, final temperature of mixture will be

T_f = 100°C

28. Answer (2)

Hint : Use concept of conduction.

Sol. : $\frac{2KA(100-T)}{\ell} = \frac{(T-50)2KA}{\ell} + \frac{(T-20)KA}{\ell}$

$200 - 2T = 2T - 100 + T - 20$

$5T = 320$

$T = 64°C$

29. Answer (3)

Hint : Wien's law $\lambda_m T$ = constant

Sol. : $\lambda_m \propto \frac{1}{T}$

$\frac{\lambda_{m_1}}{\lambda_{m_2}} = \frac{T_2}{T_1}$

$\lambda_{m_2} = \frac{T_1}{T_2}\lambda_{m_1} = \frac{2500}{1500} \times 300$

= 500 nm

30. Answer (2)

Hint : $\left(-\frac{dT}{dt}\right) = K\left(\frac{T_1 + T_2}{2} - T_{surr}\right)$

Sol. : $\left(\frac{10}{10}\right) = K\left(\frac{80+70}{2} - 25\right)$

$\Rightarrow \quad K = \frac{1}{50}$

Now $\frac{10}{t} = \frac{1}{50}\left(\frac{70+60}{2} - 25\right)$

$\frac{10}{t} = \frac{4}{5}$

t = 12.5 minutes

31. Answer (1)

Hint : $\Delta\ell = \ell\alpha, \Delta\theta$

Sol. : $\ell'_1 - \ell_1 = \ell_1\alpha_1\Delta\theta$

and $\ell'_2 - \ell_2 = \ell_2\alpha_2\Delta\theta$

$\ell'_1 - \ell'_2 = (\ell_1 - \ell_2) + (\ell_1\alpha_1 - \ell_2\alpha_2)\Delta\theta$

Since $\ell'_1 - \ell'_2 = \ell_1 - \ell_2$

Hence $\ell_1\alpha_1 - \ell_2\alpha_2 = 0$

$\frac{\ell_1}{\ell_2} = \frac{\alpha_2}{\alpha_1}$

32. Answer (4)

Hint : Use $PV = nRT$

Sol. : At constant volume (V = constant)

$P = \frac{nR}{V}T$

$P \propto T$

33. Answer (3)

Hint : Use first law thermodynamics

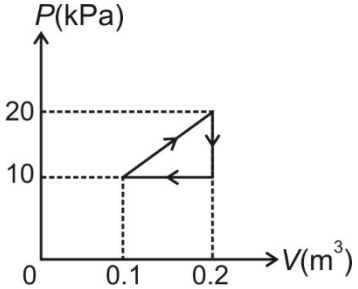
Sol. : From the process A to B, temperature of gas decreases as well as volume also decreases. Hence

$\Delta T < 0$, $\Delta U < 0$ and $W < 0$

34. Answer (1)

Hint : Work done by the gas = area of the loop.

Sol. :



W = area of cycle

$= \frac{1}{2} \times (20-10) \times 10^3 \times (0.2-0.1)$

$= 5 \times 10^{+3} \times 0.1$

= 500 J

35. Answer (2)

Hint : Efficiency of Carnot heat engine

$$= \eta = 1 - \frac{T_{Low}}{T_{High}}$$

Sol. : $\eta = 1 - \frac{273}{273+273} = 1 - \frac{1}{2} = \frac{1}{2}$

36. Answer (3)

Hint : Use molar specific heat for polytropic process

$$C = C_V + \frac{R}{1-x}$$

Sol. : $P \propto V^{+3} \Rightarrow PV^{-3}$ = constant

$$C = C_V + \frac{R}{1+3} = C_V + \frac{R}{4}$$

$$C = \frac{5R}{2} + \frac{R}{4} = \frac{11R}{4} \qquad \left[\because C_V = \frac{5R}{2}\right]$$

Heat = $Q = nC\Delta T = 2 \times \frac{11}{4}R \times 100 = 550R$

$$W = \frac{nR\Delta T}{1-x} = \frac{2 \times R \times 100}{1+3} = 50R$$

$$\frac{W}{Q} = \frac{50R}{550R} = \frac{1}{11}$$

37. Answer (2)

Hint : Use $\eta = 1 - \frac{T_{sink}}{T_{source}}$, for carnot engine

Sol. : $\frac{1}{2} = 1 - \frac{T_2}{T_1} \Rightarrow \frac{T_2}{T_1} = \frac{1}{2}$

$$\frac{3}{4} = 1 - \frac{T_2 - 200}{T_1} \Rightarrow \frac{T_2 - 200}{T_1} = \frac{1}{4}$$

$$\frac{T_2}{T_1} - \frac{200}{T_1} = \frac{1}{4}$$

$$\frac{1}{2} - \frac{1}{4} = \frac{200}{T_1}$$

T_1 = 800 K

38. Answer (1)

Hint : Use isothermal elasticity = P
and adiabatic elasticity = γP

Sol. : Given $B_{isotherm} = P = 5 \times 10^5$ N/m^2

Then $B_{adiabatic} = \gamma P = \frac{7}{5} \times 5 \times 10^5$

= 7 × 10^5 N/m^2

39. Answer (3)

Hint : Use $\frac{W}{Q_2} = \frac{T_1 - T_2}{T_2}$

Sol. : $\frac{W}{Q_2} = \frac{T_1 - T_2}{T_2}$

$$\frac{W}{500} = \frac{600 - 400}{400}$$

$$W = \frac{200 \times 500}{400} = 250 \text{ cal}$$

40. Answer (1)

Hint : For adiabatic process $TV^{\gamma-1}$ = constant

Sol. : $\frac{T_1}{T_2} = \left(\frac{V_2}{V_1}\right)^{\gamma-1}$

$$T_2 = T_1\left(\frac{V_1}{V_2}\right)^{\gamma-1} = 500 \times \left(\frac{V}{27V}\right)^{\frac{5}{3}-1}$$

$$= 500 \times \left(\frac{1}{27}\right)^{\frac{2}{3}} = \frac{500}{9}$$

= 55.55 K

41. Answer (2)

Hint : Use $\Delta Q = \Delta U + W$ and $\Delta Q = nC_P\Delta T$ and $\Delta U = nC_V\Delta T$

Sol. : $\frac{\Delta U}{\Delta Q} = \frac{nC_V\Delta T}{nC_P\Delta T} = \frac{C_V}{C_P} = \frac{1}{\gamma}$

$$= \frac{1}{\left(\frac{7}{5}\right)} = \frac{5}{7} \qquad \left[\because \gamma_{diatomic} = \frac{7}{5}\right]$$

42. Answer (4)

Hint : Coefficient of performance of refrigerator

$$\beta = \frac{Q_2}{W}$$

Sol. : $\beta = \frac{Q_2}{W} = \frac{T_2}{T_1 - T_2}$

$$7 = \frac{266}{T - 263}$$

$7T = 8 \times 266$

$$T = \frac{8}{7} \times 266 = 304 \text{ K}$$

$T = 304 - 273 = 31°C$

43. Answer (1)

Hint : Use PV^{γ} = constant

Sol. : Slope of adiabatic process is given as

PV^{γ} = constant

$P^{\gamma}V^{\gamma-1}dV + V^{\gamma}dP = 0$

$$\frac{dP}{dV} = -\gamma\frac{P}{V}$$

Now $\gamma_{mono} > \gamma_{dia}$

Hence $\left|\frac{dP}{dV}\right|_{mono} > \left|\frac{dP}{dV}\right|_{dia}$

44. Answer (2)

Hint : Use $W = nRT\ln\left(\frac{V_2}{V_1}\right)$ for isothermal process

Sol. : $W = 1\times R\times 300\times\ln\left(\frac{2V}{V}\right)$

$W = 300R\ln(2)$

45. Answer (4)

Hint : Use $PV = nRT$

Sol. : For process $A \to B$, V = constant

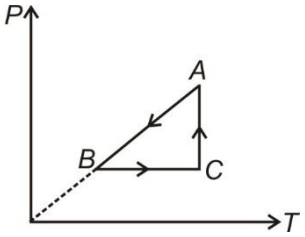
$$P = \frac{nR}{V}\cdot T$$

$P \propto T$

For process $B \to C$, P = constant

For process $C \to A$, T = constant

Hence correct plot for $P - T$ curve is



[CHEMISTRY]

46. Answer (2)

Hint : With increasing size of atom, metallic bonding decreases, hence melting point decreases.

47. Answer (4)

Hint : F_2 cannot be oxidised because it is most electronegative element.

Sol.: $\overset{0}{P}_4 + 3\bar{O}H + 3H_2O \to \overset{-3}{P}H_3 + 3H_2\overset{+1}{P}O_2^-$

$\overset{0}{S}_8 + 12\bar{O}H \to 4S^{2-} + 2\overset{+2}{S}_2O_3^{2-} + 6H_2O$

$Cl_2 + 2\bar{O}H \to \overset{+1}{C}lO^- + Cl^- + H_2O$

$2F_2 + 2\bar{O}H \to 2\bar{F} + OF_2 + H_2O$

48. Answer (2)

Hint : *n*-factor of thiosulphate is 8

Sol. :

$8MnO_4^- + 3\overset{+2}{S}_2O_3^{2-} + H_2O \to 8MnO_2 + 6\overset{+6}{S}O_4^{2-} + 2\bar{O}H$

mole of thiosulphate required per mole of MnO_4^- ion is $\frac{3}{8}$.

49. Answer (2)

Hint : Oxidation state of P in PH_3 is –3

Sol. :

Compound	Oxidation state of phosphorus
PH_3	–3
H_3PO_2	+1
H_3PO_3	+3
H_3PO_4	+5

50. Answer (3)

Hint : Higher the oxidation potential higher is the reducing power.

51. Answer (3)

Hint : Oxidation number of H in N_3H is +1.

Sol. : Oxidation number of N in N_3H is $-\frac{1}{3}$

Oxidation number of S in SO_3^{2-} is +4

Oxidation number Mn in MnO_4^{2-} is +6

52. Answer (1)

Hint : Volume strength of H_2O_2 = 11.2 × molarity (M)

16.8 = 11.2 × M

Molarity = $\frac{16.8}{11.2} = 1.5$ M

53. Answer (3)

Hint : $Al_4C_3 + 12D_2O \to 3CD_4 + 4Al(OD)_3$

54. Answer (4)

Hint : Clark's method is used to remove temporary hardness of water.

55. Answer (3)

Hint : H_2O_2 is used as both oxidising and reducing agent.

Sol. : $PbS + 4H_2O_2 \to PbSO_4 + 4H_2O$

$I_2 + H_2O_2 + 2\bar{O}H \to 2I^- + 2H_2O + O_2$

56. Answer (3)

Hint : Standard reduction potential of Cu^{2+}/Cu couple is 0.34 V.

Sol. : Metals having positive standard reduction potential value, do not liberate H_2 gas on reaction with dil HCl.

57. Answer (3)

Hint : Al_2O_3 is an amphoteric oxide

Sol. : Al_2O_3 is an amphoteric oxide while K_2O, Li_2O and MgO are basic oxides.

$2NaOH + Al_2O_3 \rightarrow 2NaAlO_2 + H_2O$

58. Answer (4)

Hint : Moving down the group hydration enthalpy of group II elements decreases whereas lattice enthalpy remains almost constant.

Sol. : For $BaSO_4$ lattice enthalpy is higher than hydration enthalpy.

59. Answer (2)

Hint : In the vapour phase $BeCl_2$ forms a chloro-bridged dimer, which dissociates into the linear monomer at high temperatures of the order of 1200 K.

60. Answer (3)

Hint : Potassium ions are most abundant cations within cell fluids.

61. Answer (4)

Hint : Alkali metal carbonates are thermally more stable than alkaline earth metal carbonates.

Sol. : For both alkali metal and alkaline earth metal carbonates the stability increases down the group.

62. Answer (3)

Hint : $MgCl_2$ and LiCl both are deliquescent solids

Sol. : Both LiCl and $MgCl_2$ are deliquescent and crystallise from aqueous solution as hydrate, $LiCl \cdot 2H_2O$ and $MgCl_2 \cdot 8H_2O$.

63. Answer (2)

Hint : Soda ash is Na_2CO_3 and Glauber's salt is $Na_2SO_4 \cdot 10H_2O$.

64. Answer (2)

Hint : Down the group +2 oxidation state is more stable due to inert pair effect.

65. Answer (2)

Hint : Graphite and boron nitride have sheet like structure.

66. Answer (4)

Hint: The species which contains vacant orbital is called Lewis acid.

67. Answer (1)

Hint : GeO is an acidic oxide.

Sol. : PbO_2 is an amphoteric oxide.

68. Answer (3)

Hint : Asbestos is a chain silicate.

69. Answer (1)

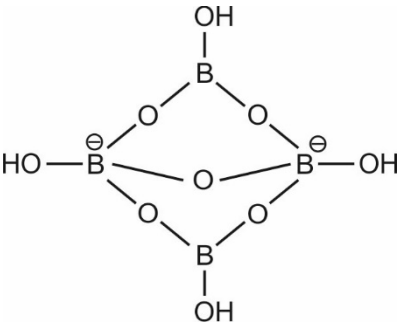
Hint : Back donation of electrons in BF_3 is maximum.

Sol. : As the size of orbital of halogens increases, back donation of electrons to B atom decreases. Hence Lewis acidity order is $BF_3 < BCl_3 < BBr_3$.

70. Answer (3)

Hint : Borax is $Na_2[B_4O_5(OH)_4] \cdot 8H_2O$

Sol. :



Water of crystallization in borax molecule is 8.

71. Answer (1)

Hint : In group 13 elements, down the group +1 oxidation state becomes more stable due to inert pair effect.

72. Answer (4)

Hint : (N_2 + CO) is called producer gas.

Sol. : (CO + H_2) is called synthesis gas.

73. Answer (3)

Hint : Hydrolysis of CH_3SiCl_3 gives cross-linked polymer.

74. Answer (3)

Hint : Boric acid is a Lewis acid.

75. Answer (3)

Hint: Zn will act as cathode and Mg will act as anode.

Sol.: Net cell reaction

$Mg(s) + Zn^{2+}(aq) \rightarrow Mg^{2+}(aq) + Zn(s)$

$E^0_{cell} = E^0_{cathode} - E^0_{anode}$

= (–0.76 + 2.36) V = 1.6 V.

76. Answer (3)

Hint : Reducing agent decreases the oxidation number of the reacting species.

Sol. : $\overset{-}{I} \rightarrow \overset{+5}{I}O_3^-$

$\overset{-2}{Pb}S \rightarrow \overset{+6}{Pb}SO_4$

$\overset{+7}{MnO_4^-} \rightarrow \overset{+4}{MnO_2}$

$\overset{+2}{S_2}O_3^{2-} \rightarrow \overset{+2.5}{S_4}O_4^{2-}$

MnO_4^- will be converted to MnO_2 by reducing agent.

77. Answer (2)

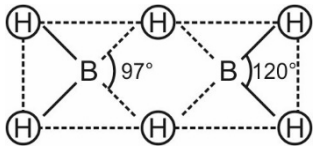
Hint : Higher the lattice enthalpy more stable is the hydride formed.

Sol. : With increasing size of alkaline earth metal cation thermal stability of hydrides decreases.

78. Answer (4)

Hint : B_2H_6 is a three dimensional molecule.

Sol. :



79. Answer (3)

Hint : In Iodine titration, starch is used as indicator which forms a blue coloured complex with iodine.

80. Answer (4)

Hint : Sum of the oxidation numbers of all elements in a compound is zero.

Sol.: $X(YZ_4)_3$

X = –3

Y = +5

Z = –1

$-3+\{5+(-1\times 4)\}\times 3=0$

$\therefore$ Formula of compound = $X(YZ_4)_3$.

81. Answer (2)

Hint : Graphite is thermodynamically most stable allotrope of carbon.

82. Answer (3)

Hint : Due to poor shielding effect of *d* orbitals in gallium, the atomic radius is smaller than aluminium.

83. Answer (2)

Hint : Suspension of slaked lime ($Ca(OH)_2$) in water is called milk of lime.

84. Answer (1)

Hint : $E^0_{Li^+/Li} = -3.04\,V$ and $E^0_{Na^+/Na} = -2.7\,V$

Sol.: Lithium is better reducing agent than sodium.

85. Answer (3)

Hint: Na_2O_2 contains trace amount of superoxide ion which is paramagnetic in nature.

Sol. : Paramagnetic species are generally coloured.

86. Answer (2)

Hint : Alkali metal hydroxides are more basic than alkaline earth metal hydroxides.

87. Answer (1)

Hint : In Castner Kellner cell, brine solution is electrolysed using mercury cathode and carbon anode.

88. Answer (4)

Hint : KNO_3 does not give NO_2 gas on heating.

Sol. : Group II metal nitrates give NO_2 gas on heating.

$2MNO_3 \xrightarrow{\Delta} 2MNO_2 + O_2$

M = Na, K, Rb

$2LiNO_3 \xrightarrow{\Delta} Li_2O + 2NO_2 + \frac{1}{2}O_2$

$2M(NO_3)_2 \xrightarrow{\Delta} 2MO + 4NO_2 + O_2$

M = Be, Mg, Ca, Sr, Ba.

89. Answer (3)

Hint : Higher the charge density of the ion higher is the hydration enthalpy.

90. Answer (1)

Hint : Percentage of CaO in Portland cement is 50 – 60%.

[BIOLOGY]

91. Answer (3)

Sol.: Sclereids are part of sclerenchyma which is a dead mechanical tissue.

92. Answer (3)

Sol.: Tracheids and vessels both are dead, lignified and water conducting part of xylem. Vessels have perforated end plates.

93. Answer (2)

Hint: Secondary meristems are originated during the secondary growth via dedifferentiation while primary meristems are present during the early growth of a plant.

Sol.: Intrafasicular cambium present in the conjoint vascular bundles is a lateral meristem of primary origin.

94. Answer (4)

Hint: First formed primary xylem is called protoxylem.

Sol.: Protoxylem lies towards periphery in radial vascular bundle of roots which is called exarch arrangement of xylem.

95. Answer (2)

Hint: Young dicot stem has living mechanical tissue.

Sol.: Hypodermis of young dicot stem is composed of collenchyma which is involved in photosynthesis and in providing mechanical support.

96. Answer (3)

Hint: Thick inner wall is present in the guard cells of stomata in dicots.

Sol.: Guard cells contain chloroplasts, surrounds stomatal aperture and are of dumb – bell shaped in grasses.

97. Answer (1)

Sol.: Monocots usually lack phloem parenchyma.

98. Answer (4)

Hint: Root epidermis cells lack covering of cuticle at their outer surface.

Sol.: Epidermis is generally single layered, composed of parenchymatous cells and its cells lack intercellular space.

99. Answer (2)

Sol.: Vascular tissues i.e. xylem and phloem constitute vascular tissue system.

100. Answer (4)

Hint: Water containing cavities are present in vascular bundles of monocot stem

Sol.: Presence of collenchymatous hypodermis is an exclusive feature of dicot stems while presence of radial vascular bundles is the feature associated with roots. Occurrence of well developed pith is common between both monocot root and dicot stem.

101. Answer (1)

Hint: Open vascular bundles have cambium in them.

Sol.: Conjoint-collateral vascular bundles are present in dicot stem, monocot stem, dicot leaves and monocot leaves but out of them vascular bundles of only dicot stem have cambium hence they are of open type.

102. Answer (3)

Hint: Cell wall of root endodermal cells is impermeable to water because of the deposition of waxy substance.

Sol.: Waxy substance suberin is deposited in the form of casparian strips in root endodermal cells.

103. Answer (4)

Hint: Bark is non-technical term used for all the tissues which are exterior to vascular cambium.

Sol.: Secondary xylem or wood is formed inner to the vascular cambium which is not the constituent of bark.

104. Answer (2)

Hint: Vascular bundles of maize stem lack cambium.

Sol.: In maize stem, bundles sheath is sclerenchymatous, vascular bundles are scattered in ground tissue and larger are towards the centre and smaller towards periphery.

105. Answer (3)

Hint: Bulliform cells are specific epidermal cells present in grass leaves.

Sol.: Bulliform cells are large sized, empty & colourless cells, present on adaxial epidermis of grass leaves.

106. Answer (2)

Hint: Vascular cambium in dicot roots is formed at the time of secondary growth.

Sol.: In dicot roots, vascular cambium is formed by dedifferentiation of pericycle cells above the protoxylem and conjunctive tissue below primary phloem. Hence, the vascular cambium of dicot roots is completely secondary in origin.

107. Answer (1)

Sol.: Among the vascular plants, presence of sieve tubes is a feature of angiosperms only.

108. Answer (1)

Hint: Heartwood is central and older part while sapwood is younger and peripheral part of secondary xylem.

Sol.: Heartwood is hard and durable part of wood. It has deposition of different organic substances and is resistant to the attack of microorganisms. Sapwood is the water conducting, peripheral part of wood.

109. Answer (2)

Hint: Mesophyll of dorsiventral leaves is differentiated into two parts.

Sol.: Part of mesophyll towards abaxial epidermis with large number of intercellular spaces is called spongy parenchyma.

110. Answer (4)

Hint: Spring wood is called early wood while autumn wood is also known as late wood.

Sol.: Spring wood has large number of xylary elements, lower density and vessels with wider lumen.

111. Answer (2)

Hint: Endodermis of dicot stems is called starch sheath due to storage of starch.

Sol.: Pericycle, vascular bundles and pith are combindly called stele.

112. Answer (4)

Hint: Classification system given by Bentham and Hooker was a natural system of classification.

Sol.: Natural classification system given by Bentham and Hooker was not based on phylogeny or evolutionary relationships between plants.

113. Answer (3)

Sol.: In artificial classification, vegetative and sexual characters are given equal weightage.

114. Answer (1)

Hint: Cytotaxonomy is based upon chromosomal structure, number and behaviour.

Sol.: Numerical taxonomy includes hundreds of characters simultaneously and becomes important in the absence of fossil evidence.

115. Answer (3)

Sol.: Isogamy by fusion of two non-motile gametes is observed in *Spirogyra.*

116. Answer (2)

Hint: Brown algae show variable shades of brown depending upon the amount of xanthophyll pigment such as fucoxanthin.

Sol.: Brown algae have pyriform gametes with laterally attached flagella. Polysulphated esters are present in cell wall of red algae.

117. Answer (4)

Hint: Red alga *Gelidium* is the source of agar.

Sol.: *Porphyra* – Floridean starch as stored food

Ectocarpus – Haplo-diplontic life cycle

Fucus – Rich source of iodine

118. Answer (3)

Hint: Bryophytes lack vascular tissues.

Sol.: Pteridophytes are called vascular cryptogams.

119. Answer (4)

Hint: Red algae lack motile structures in their life cycle.

Sol.: Both brown and red algae have marine habitat, chlorophyll 'a' pigment and thalloid body. Brown algae produce zoospores as asexual spores while red algae produce non-motile spores.

120. Answer (1)

Hint: Mosses along with lichens are the first organisms to colonise on rocks.

Sol.: Bryophytes in general are of little economic importance but are of great ecological importance.

121. Answer (3)

Hint: Dorsiventral and haploid thallus of *Marchantia* has photosynthetic cells.

Sol.: Antheridiophore, gemma cup and rhizoids are haploid structures of *Marchantia* present on its dorsiventral thallus. Capsule is the diploid structure of sporophytic generation.

122. Answer (2)

Sol.: *Sphagnum*, a moss provides peat which is used as fuel.

123. Answer (3)

Hint: Rhizoids are multicellular and branched in mosses while liverworts have unicellular and unbranched rhizoids.

Sol.: Mosses generally have more elaborated mechanism of spore dispersal than liverworts. Leafy stage of mosses develops from secondary protonema as lateral bud.

124. Answer (2)

Hint: Small, photosynthetic and monoecious gametophyte (prothallus) is formed in homosporous pteridophytes.

Sol.: *Salvinia*, a heterosporous pteridophyte produces male and female gametophyte by the germination of micro and megaspores respectively.

125. Answer (2)

Hint: Pteridophytes are first terrestrial plants to have vascular tissues.

Sol.: Plant body of pteridophytes is sporophyte which is differentiated into root, stem and leaves. They require water for fertilisation.

126. Answer (1)

Hint: Macrophyllous leaves are present in ferns.

Sol.: Heterospory and formation of cones are the features associated with *Selaginella*. Being heterosporous it does not forms prothallus.

127. Answer (4)

Hint: Seeds in gymnosperms are naked.

Sol.: In gymnosperms due to absence of fruit, seeds are not covered in fruit wall.

128. Answer (1)

Hint: *Cycas* is a dioecious plant.

Sol.: Stem is unbranched in *Cycas* while branched in *Pinus*.

129. Answer (3)

Hint: *Ginkgo biloba* is a living fossil.

Sol.: *Pinus* – Needle shaped leaves

Cycas – Symbiotic association with N_2 – fixing cyanobacteria

Sequoia – Largest gymnosperm

130. Answer (2)

Sol.: After fertilisation, ovules develop into seeds in angiosperms.

131. Answer (3)

Hint: Egg apparatus is a part of the female gametophyte (embryosac) of angiosperms.

Sol.: Egg apparatus consists of one egg cell and two synergids.

132. Answer (4)

Hint: Gametophytes in gymnosperms are extremely reduced.

Sol.: Male and female gametophytes of gymnosperms do not have an independent and free living existence.

133. Answer (4)

Sol.: Leaves of conifers have thick cuticle, sunken stomata and are needle shaped to withstand extreme conditions and to prevent water loss.

134. Answer (3)

Hint: Haploid organisms show haplontic life cycle.

Sol.: In the haplontic life cycle, single celled zygote represents the sporophyte.

135. Answer (3)

Hint: Along with few algae, all gymnosperms and angiosperms show diplontic life cycle.

Sol.: *Fucus*, *Wolfia*, *Eucalyptus*, *Gnetum* – Diplontic life cycle

Volvox – Haplontic life cycle

Polysiphonia – Haplo-diplontic life cycle

136. Answer (4)

Hint : Vasopressin is also known as antidiuretic hormone.

Sol. : Vasopressin reduces water loss from the body. It prevents diuresis and acts mainly on kidneys by stimulating the reabsorption of water and electrolytes.

137. Answer (2)

Hint : Hormone released from adrenal cortex.

Sol. : Iodothyronines - Thyroid hormone.

Steroidal hormones - Cortisol, testosterone, estradiol, progesterone etc. Proteinaceous hormones include insulin, glucagon, TCT, pituitary hormones and hypothalamic hormones.

138. Answer (1)

Hint : This term represents decrease in blood sugar level.

Sol. : Glucocorticoids synthesize glucose from amino acids and glycerol. They release fatty acids in blood and degrade proteins within the cells.

139. Answer (2)

Hint : Hormone secreted by cells of PCT.

Sol. : PTH stimulates the kidney to release calcitriol by action of hydroxylase enzyme in nephron.

140. Answer (1)

Hint : Structure commonly known as wind pipe.

Sol. : Thyroid gland is composed of two lateral lobes which are located on either side of trachea. These lobes are interconnected with a thin flap of connective tissue called isthmus.

141. Answer (2)

Hint : Hormone acts as messenger between cells.

Sol. : Hormones act as intercellular messengers and are chemicals produced by endocrine glands.

142. Answer (3)

Hint : Structure where ribs are attached.

Sol. : Thymus gland is a lobular structure located between lungs behind sternum on the ventral side of aorta.

143. Answer (4)

Hint : Monosynaptic neuronal activity.

Sol. : Rods are very sensitive in dim light. Cones are very sensitive and operate in day light. Depolarisation of sensory hair cells present in cochlea takes place by opening of mechanical gated K^+ channels.

144. Answer (4)

Hint : Joint between wrist bones.

Sol. : The eight bones of the wrist in human are called carpals. Gliding joint is present between wrist bones. Hinge joint is present between phalanges.

145. Answer (2)

Hint : Disease in which bone loses its mineral deposits.

Sol. : Decreased level of estrogen is a common cause of osteoporosis in females at menopause. Myasthenia gravis is an autoimmune disorder that affects neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscles.

Gout is inflammation of joints due to accumulation of uric acid crystals.

146. Answer (3)

Hint : Impulse transmission through a neuron.

Sol. : Stimulus from the environment is detected by afferent processes called dendrites. The stimulus acquired is transmitted in the form of electrical impulse by efferent process called axon.

147. Answer (4)

Hint : Structure that not only exhibits neural activity but also controls endocrine functions.

Sol. : Hypothalamus is the thermoregulatory centre in our brain. Cerebellum coordinates locomotory activities in the body. Medulla oblongata contains centres which control respiration, cardiovascular reflexes and gastric secretions.

148. Answer (2)

Hint : Protein coded by largest human gene.

Sol. : In muscular dystrophy, due to absence of dystrophin protein, tension generated by sarcomere is not transmitted to tendons. Dislocation is a displacement of the articular surface of a joint. Osteoarthritis is a joint disease characterised by the degeneration of articular cartilage and proliferation of new bones.

149. Answer (1)

Hint : Vertebrosternal ribs are true ribs.

Sol. : There are seven pairs of vertebrosternal, three pairs of vertebrochondral and two pairs of vertebral ribs in humans. Vertebrochondral ribs are 8^{th}, 9^{th} & 10^{th} pair.

150. Answer (1)

Hint : Z line bisects the I band.

Sol. : A sarcomere comprises a single A-band and half of each adjacent I-band. The part of myofibril between two successive Z-lines is called sarcomere.

151. Answer (2)

Hint : Cells which are a derivative of monocytes.

Sol. : Leucocytes and macrophages engulf the antigens or pathogens through pseudopodia. Spermatozoa exhibit flagellar movement.

152. Answer (1)

Hint : ANS controls the smooth muscle fibres.

Sol. : Nonstriated or smooth muscle fibres are innervated by autonomic nervous system while striated or skeletal muscle fibres are innervated by branches from cranial and spinal nerves (Somatic neural system).

153. Answer (3)

Hint : Divalent ion which is also present in chlorophyll.

Sol. : The G-actins polymerise to form F-actin in the presence of Mg^{2+} ions. Na^{+} and K^{+} ions are essential for impulse transmission.

154. Answer (2)

Hint : Longest bone of the body.

Sol. : Femur is bone of hind limb and a part of appendicular skeleton.

155. Answer (3)

Hint : They are paired structure.

Sol. : Glenoid cavity of scapula articulates with head of humerus to form the shoulder joint.

156. Answer (1)

Hint : Bone formed by ossification of tendon.

Sol. : Knee cap *i.e*. patella is an example of sesamoid bone. Sesamoid bones are formed in certain tendons at the joints.

157. Answer (4)

Hint : Invaginations of sarcolemma.

Sol. : Troponin T is the binding site for tropomyosin. Troponin C is the binding site for calcium. Troponin is constituted by three subunits I, T and C.

158. Answer (2)

Hint : Endoplasmic reticulum.

Sol. : Calcium ions are stored in cisternae of sarcoplasmic reticulum.

159. Answer (1)

Hint : Vascularization refers to presence of blood vessels.

Sol. : Avascular nature of cornea helps in transplantation.

160. Answer (2)

Hint : Structures associated with projecting ridge in the saccule and utricle.

Sol. : The otolith organ maintains the static balance of the body. Otolith organ consists of two structures *i.e.* saccule and utricle. The cristae in the three semicircular canals maintain the dynamic balance of the body. Both static as well as the dynamic balance are maintained by the vestibular apparatus.

161. Answer (4)

Hint : Neurilemma is absent in neurons of CNS.

Sol. : Oligodendrocytes are with few protoplasmic processes and form myelin sheath in CNS. In the absence of Schwann cells, myelin is formed by the spiral wrapping of nerve fibres by processes of oligodendrocytes. In PNS, Schwann cells form the myelin sheath.

162. Answer (4)

Hint : Inhibitory neurotransmitter.

Sol. : Acetylcholine, epinephrine, norepinephrine and glutamate are excitatory neurotransmitters.

163. Answer (1)

Hint : Function of Iridial muscles.

Sol. : Sympathetic nervous system dilates pupil while parasympathetic nervous system constricts the pupil. Sympathetic nervous system inhibits secretion of pancreatic juice, reduces bile secretion and raises blood pressure.

164. Answer (2)

Hint : Schneiderian membrane.

Sol. : Bowman's gland secrete mucus. Meibomian glands are modified sebaceous (oil) glands which are present along the edges of the eyelids. They produce an oily secretion which serves to lubricate the corneal surface and forms a thin layer of tears over the cornea.

165. Answer (3)

Hint : Perikaryon is a part of this cell.

Sol. : Nerve cells have cyton, dendrites, axon and Nodes of Ranvier as characteristic structures.

166. Answer (2)

Hint : Part of brain which has centre controlling urge for drinking water.

Sol. : Hypothalamus is the part of forebrain. Eustachian tube equalizes air pressure on either side of tympanic membrane.

167. Answer (3)

Hint : Layer whose latin translates into soft mother.

Sol. : Dura mater is the outer layer of the cranial meninges. It is thick and tough layer made up of tough fibrous tissue. Arachnoid is very thin middle layer made up of delicate connective tissue.

168. Answer (4)

Hint : Lobe which is located near the ear.

Sol. : Temporal lobe helps in decoding and interpretation of sound. The parietal lobe is where feelings about touch, hot and cold and pain are registered. The occipital lobe responds to the sensation of light. The voluntary motor activities are under the control of frontal lobe of cerebrum.

169. Answer (1)

Hint : Part of forebrain.

Sol. : Multipolar neurons are present in cerebral cortex. Bipolar neurons are found in the retina of the eye. Unipolar neurons are found usually in the early embryonic stage. Pseudounipolar neuron found in dorsal root ganglion of spinal nerve.

170. Answer (1)

Hint : Cells which have receptors for light.

Sol. : Next to the layer of photoreceptor cells is the intermediate layer of short-sensory bipolar cells. Inner to layer of bipolar cells is the layer of retinal ganglion cells.

171. Answer (2)

Hint : Disorder is also known as nearsightedness.

Sol. : Myopia or nearsightedness defect can be removed by using concave glasses. In hypermetropia or longsightedness, person can see distant objects clearly, but not those which are closer. This is due to antero-posterior shortening of the eyeball, so that the image is formed behind the yellow spot. The defect can be overcome by using convex lens.

172. Answer (3)

Hint : This pump maintains the electrochemical gradient between ICF and ECF.

Sol. : In resting state, voltage gated Na^+ and K^+ channels are closed. Sodium-potassium pumps require energy to transport $3Na^+$ outwards for $2K^+$ into the axoplasm because sodium-potassium pump works against the concentration gradient of Na^+ and K^+, whereas the Na^+ and K^+ leaky ion channels transport ions from high to low concentrations.

173. Answer (1)

Hint : Part of forebrain.

Sol. : Cerebrum and cerebellum are not part of brain stem. Midbrain and hindbrain form the brain stem. The hindbrain comprises pons, cerebellum and medulla oblongata.

174. Answer (1)

Hint : Mechanism of action of a proteinaceous hormone.

Sol. : 'P' represents the extra cellular receptors present on the cell surface that form a hormone receptor complex which brings about conformational changes in the cytoplasmic part of the receptor. 'Q' is a hormone such as FSH that cannot cross lipid bilayer therefore it interacts with the membrane bound receptors and does not enter the target cell.

175. Answer (1)

Hint : Hormone also known as milk let down hormone.

Sol. : Milk ejection reflex is caused by combined neurogenic and hormonal reflex that involve release of oxytocin from posterior pituitary gland. Foetal ejection reflex triggers release of oxytocin from the maternal posterior lobe of pituitary gland. Oxytocin acts on the uterine muscles and causes stronger uterine contractions to induce labor pain.

176. Answer (2)

Hint : Hormone released by pineal gland.

Sol. : Melatonin regulates the 24 hours (diurnal) rhythm of our body. It helps in maintaining the normal rhythms of sleep-wake cycle and body temperature.

177. Answer (3)

Hint : Gene hormone complex activates central dogma of the cell.

Sol. : Steroid hormones directly enter into the cell and bind with intracellular receptors in nucleus to form hormone receptor complex which interacts with the genetic material.

178. Answer (1)

Hint : Hormone released from pituitary gland.

Sol. : Hypersecretion of GH in adults leads to Acromegaly. Deficiency of corticoids (Glucocorticoid + mineralocorticoid) leads to Addison's disease. Hyper or hyposecretion of thyroxine can be associated with enlargement of thyroid gland called goitre. Insulin deficiency leads to diabetes mellitus.

179. Answer (1)

Hint : Immunity which involves differentiation of T-lymphocytes.

Sol. : Thymus gland secretes thymosin which helps in development and maturation of T cells.

180. Answer (2)

Hint : Hormone related to adrenal gland.

Sol. : Adrenaline/epinephrine/emergency hormone is secreted by adrenal medulla. Adrenaline stimulates elevation of blood glucose by converting liver glycogen to glucose, increase in oxygen consumption *etc*.

❑ ❑ ❑

All India Aakash Test Series for NEET - 2020

TEST - 7 (Code-B)

Test Date : 19/01/2020

ANSWERS

1. (4)	37. (2)	73. (2)	109. (4)	145. (2)
2. (2)	38. (3)	74. (3)	110. (2)	146. (1)
3. (1)	39. (4)	75. (4)	111. (3)	147. (1)
4. (4)	40. (3)	76. (3)	112. (1)	148. (4)
5. (2)	41. (2)	77. (2)	113. (3)	149. (3)
6. (1)	42. (1)	78. (4)	114. (4)	150. (2)
7. (3)	43. (2)	79. (3)	115. (2)	151. (3)
8. (1)	44. (3)	80. (3)	116. (4)	152. (2)
9. (2)	45. (4)	81. (3)	117. (2)	153. (1)
10. (3)	46. (1)	82. (4)	118. (1)	154. (4)
11. (2)	47. (3)	83. (3)	119. (1)	155. (4)
12. (1)	48. (4)	84. (1)	120. (2)	156. (2)
13. (3)	49. (1)	85. (3)	121. (3)	157. (1)
14. (4)	50. (2)	86. (3)	122. (2)	158. (2)
15. (1)	51. (3)	87. (2)	123. (4)	159. (4)
16. (2)	52. (1)	88. (2)	124. (3)	160. (1)
17. (3)	53. (2)	89. (4)	125. (1)	161. (3)
18. (2)	54. (3)	90. (2)	126. (4)	162. (2)
19. (4)	55. (2)	91. (3)	127. (2)	163. (3)
20. (2)	56. (4)	92. (3)	128. (4)	164. (1)
21. (2)	57. (3)	93. (4)	129. (1)	165. (2)
22. (1)	58. (4)	94. (4)	130. (3)	166. (1)
23. (1)	59. (2)	95. (3)	131. (2)	167. (1)
24. (4)	60. (3)	96. (2)	132. (4)	168. (2)
25. (2)	61. (3)	97. (3)	133. (2)	169. (4)
26. (1)	62. (3)	98. (1)	134. (3)	170. (3)
27. (4)	63. (3)	99. (4)	135. (3)	171. (2)
28. (2)	64. (4)	100. (1)	136. (2)	172. (4)
29. (2)	65. (1)	101. (2)	137. (1)	173. (4)
30. (3)	66. (3)	102. (2)	138. (1)	174. (3)
31. (1)	67. (1)	103. (3)	139. (3)	175. (2)
32. (3)	68. (3)	104. (2)	140. (2)	176. (1)
33. (1)	69. (1)	105. (3)	141. (1)	177. (2)
34. (4)	70. (4)	106. (1)	142. (1)	178. (1)
35. (3)	71. (2)	107. (4)	143. (1)	179. (2)
36. (1)	72. (2)	108. (3)	144. (3)	180. (4)

HINTS & SOLUTIONS

[PHYSICS]

1. Answer (4)

Hint : Use $PV = nRT$

Sol. : For process $A \to B$, V = constant

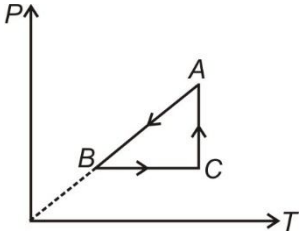
$$P = \frac{nR}{V} \cdot T$$

$$P \propto T$$

For process $B \to C$, P = constant

For process $C \to A$, T = constant

Hence correct plot for $P - T$ curve is



2. Answer (2)

Hint : Use $W = nRT \ln\left(\frac{V_2}{V_1}\right)$ for isothermal process

Sol. : $W = 1 \times R \times 300 \times \ln\left(\frac{2V}{V}\right)$

$W = 300R \ln(2)$

3. Answer (1)

Hint : Use PV^{γ} = constant

Sol. : Slope of adiabatic process is given as

PV^{γ} = constant

$P^{\gamma}V^{\gamma-1}dV + V^{\gamma}dP = 0$

$$\frac{dP}{dV} = -\gamma\frac{P}{V}$$

Now $\gamma_{mono} > \gamma_{dia}$

Hence $\left|\frac{dP}{dV}\right|_{mono} > \left|\frac{dP}{dV}\right|_{dia}$

4. Answer (4)

Hint : Coefficient of performance of refrigerator

$$\beta = \frac{Q_2}{W}$$

Sol. : $\beta = \frac{Q_2}{W} = \frac{T_2}{T_1 - T_2}$

$$7 = \frac{266}{T - 263}$$

$7T = 8 \times 266$

$$T = \frac{8}{7} \times 266 = 304\ \text{K}$$

$T = 304 - 273 = 31°\text{C}$

5. Answer (2)

Hint : Use $\Delta Q = \Delta U + W$ and $\Delta Q = nC_P\Delta T$ and $\Delta U = nC_V\Delta T$

Sol. : $\frac{\Delta U}{\Delta Q} = \frac{nC_V\Delta T}{nC_P\Delta T} = \frac{C_V}{C_P} = \frac{1}{\gamma}$

$$= \frac{1}{\left(\frac{7}{5}\right)} = \frac{5}{7} \qquad \left[\because\ \gamma_{\text{diatomic}} = \frac{7}{5}\right]$$

6. Answer (1)

Hint : For adiabatic process $TV^{\gamma-1}$ = constant

Sol. : $\frac{T_1}{T_2} = \left(\frac{V_2}{V_1}\right)^{\gamma-1}$

$$T_2 = T_1\left(\frac{V_1}{V_2}\right)^{\gamma-1} = 500 \times \left(\frac{V}{27V}\right)^{\frac{5}{3}-1}$$

$$= 500 \times \left(\frac{1}{27}\right)^{\frac{2}{3}} = \frac{500}{9}$$

= 55.55 K

7. Answer (3)

Hint : Use $\frac{W}{Q_2} = \frac{T_1 - T_2}{T_2}$

Sol. : $\frac{W}{Q_2} = \frac{T_1 - T_2}{T_2}$

$$\frac{W}{500} = \frac{600 - 400}{400}$$

$$W = \frac{200 \times 500}{400} = 250\ \text{cal}$$

8. Answer (1)

Hint : Use isothermal elasticity = P

and adiabatic elasticity = γP

Sol. : Given $B_{isotherm} = P = 5 \times 10^5\ \text{N/m}^2$

Then $B_{adiabatic} = \gamma P = \frac{7}{5} \times 5 \times 10^5$

$= 7 \times 10^5\ \text{N/m}^2$

9. Answer (2)

Hint : Use $\eta = 1 - \frac{T_{sink}}{T_{source}}$, for carnot engine

Sol. : $\frac{1}{2} = 1 - \frac{T_2}{T_1} \Rightarrow \frac{T_2}{T_1} = \frac{1}{2}$

$\frac{3}{4} = 1 - \frac{T_2 - 200}{T_1} \Rightarrow \frac{T_2 - 200}{T_1} = \frac{1}{4}$

$\frac{T_2}{T_1} - \frac{200}{T_1} = \frac{1}{4}$

$\frac{1}{2} - \frac{1}{4} = \frac{200}{T_1}$

$T_1 = 800$ K

10. Answer (3)

Hint : Use molar specific heat for polytropic process

$$C = C_V + \frac{R}{1-x}$$

Sol. : $P \propto V^{+3} \Rightarrow PV^{-3}$ = constant

$C = C_V + \frac{R}{1+3} = C_V + \frac{R}{4}$

$C = \frac{5R}{2} + \frac{R}{4} = \frac{11R}{4} \quad \left[\because C_V = \frac{5R}{2}\right]$

Heat = $Q = nC\Delta T = 2 \times \frac{11}{4}R \times 100 = 550R$

$W = \frac{nR\Delta T}{1-x} = \frac{2 \times R \times 100}{1+3} = 50R$

$\frac{W}{Q} = \frac{50R}{550R} = \frac{1}{11}$

11. Answer (2)

Hint : Efficiency of Carnot heat engine

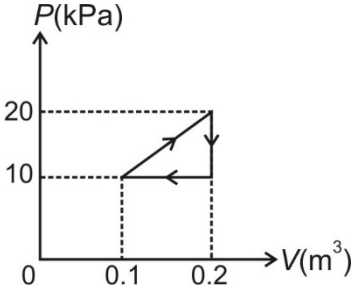
$$= \eta = 1 - \frac{T_{Low}}{T_{High}}$$

Sol. : $\eta = 1 - \frac{273}{273+273} = 1 - \frac{1}{2} = \frac{1}{2}$

12. Answer (1)

Hint : Work done by the gas = area of the loop.

Sol. :



W = area of cycle

$= \frac{1}{2} \times (20-10) \times 10^3 \times (0.2-0.1)$

$= 5 \times 10^{+3} \times 0.1$

$= 500$ J

13. Answer (3)

Hint : Use first law thermodynamics

Sol. : From the process A to B, temperature of gas decreases as well as volume also decreases. Hence

$\Delta T < 0$, $\Delta U < 0$ and $W < 0$

14. Answer (4)

Hint : Use $PV = nRT$

Sol. : At constant volume (V = constant)

$P = \frac{nR}{V}T$

$P \propto T$

15. Answer (1)

Hint : $\Delta\ell = \ell\alpha, \Delta\theta$

Sol. : $\ell_1' - \ell_1 = \ell_1\alpha_1\Delta\theta$

and $\ell_2' - \ell_2 = \ell_2\alpha_2\Delta\theta$

$\ell_1' - \ell_2' = (\ell_1 - \ell_2) + (\ell_1\alpha_1 - \ell_2\alpha_2)\Delta\theta$

Since $\ell_1' - \ell_2' = \ell_1 - \ell_2$

Hence $\ell_1\alpha_1 - \ell_2\alpha_2 = 0$

$\frac{\ell_1}{\ell_2} = \frac{\alpha_2}{\alpha_1}$

16. Answer (2)

Hint : $\left(-\frac{dT}{dt}\right) = K\left(\frac{T_1 + T_2}{2} - T_{surr}\right)$

Sol. : $\left(\frac{10}{10}\right) = K\left(\frac{80+70}{2} - 25\right)$

$\Rightarrow \quad K = \frac{1}{50}$

Now $\frac{10}{t} = \frac{1}{50}\left(\frac{70+60}{2} - 25\right)$

$\frac{10}{t} = \frac{4}{5}$

$t = 12.5$ minutes

17. Answer (3)

Hint : Wien's law $\lambda_m T$ = constant

Sol. : $\lambda_m \propto \frac{1}{T}$

$$\frac{\lambda_{m_1}}{\lambda_{m_2}} = \frac{T_2}{T_1}$$

$$\lambda_{m_2} = \frac{T_1}{T_2}\lambda_{m_1} = \frac{2500}{1500} \times 300$$

= 500 nm

18. Answer (2)

Hint : Use concept of conduction.

Sol. : $\frac{2KA(100-T)}{\ell} = \frac{(T-50)2KA}{\ell} + \frac{(T-20)KA}{\ell}$

$200 - 2T = 2T - 100 + T - 20$

$5T = 320$

$T = 64°C$

19. Answer (4)

Hint : Use heat loss = Heat gain.

Sol. : Heat released by steam in conversion of 100°C steam to 100°C water = 5 × 540 = 2700 cal.

Heat required to convert ice at 0°C to water at 0°C = 5 × 80 = 400 cal

Heat required to increase temperature of 5 g water from 0°C to 100°C = 5 × 1 × 100 = 500 cal.

Total heat required < Heat released

Hence, final temperature of mixture will be

$T_f = 100°C$

20. Answer (2)

Hint : For series combination.

$R_{Th} = R_{Th_1} + R_{Th_2} + \cdots$

Where $R_{Th} = \frac{L}{KA}$

Sol. : $\frac{2L}{K_{eq}A} = \frac{L}{2KA} + \frac{L}{3KA}$

$$K_{eq} = \frac{2 \times 2K \times 3K}{5} = \frac{12}{5}K = 2.4\,K$$

21. Answer (2)

Hint : $\Delta V = V\gamma\Delta T$

Sol. : Since $\gamma = 3\alpha$

$$\Delta V = \gamma V \cdot \Delta T = 3\alpha \cdot \frac{4}{3}\pi R^3 \cdot \Delta T$$

$= 4\pi R^3 \alpha \Delta T$

22. Answer (1)

Hint : Anomalous expansion of water.

Sol. : Density of water is maximum at 4°C.

$F_B = \rho V g$

$F_B \propto \rho$ ($\because V$ is constant)

$F_{4°C} > F_{0°C}$ because $\rho_{4°C} > \rho_{0°C}$

23. Answer (1)

Hint : Use thermal expansion and angular momentum conservation.

Sol. : As temperature decreases $\Rightarrow$ length of rod decreases $\Rightarrow$ moment of inertia decreases

Hence, from $I_1\omega_1 = I_2\omega_2$

$\Rightarrow$ Angular velocity increases.

24. Answer (4)

Hint : Use excess pressure due to surface tension.

Sol. : Given vapour pressure $P = 2.33 \times 10^3$ Pa

Surface tension $S = 7.28 \times 10^{-2}$ N/m

The drop will evaporate if water pressure is greater than the vapour pressure.

Let R is radius of water droplet formed, then

$$P = \frac{2S}{R}$$

$$R = \frac{2S}{P} = \frac{2 \times 7.28 \times 10^{-2}}{2.33 \times 10^3}$$

$= 6.25 \times 10^{-5}$ m

$= 62.5\ \mu m$

25. Answer (2)

Hint : Work done in breaking a drop of radius R in n drops of equal size is, $W = T\Delta A = 4\pi R^2 T(n^{1/3} - 1)$

Sol. : $W = 4\pi R^2 T \cdot (27^{1/3} - 1)$

$= 8\pi R^2 T$

26. Answer (1)

Hint : $\rho_{mix} = \frac{\rho_1 + \rho_2}{2}$ for equal volume

$\rho_{mix} = \frac{2\rho_1\rho_2}{\rho_1 + \rho_2}$ for equal mass

Sol. : $\frac{\rho_1 + \rho_2}{2} = 4.5$

$\rho_1 + \rho_2 = 9$ ...(i)

$\frac{2\rho_1\rho_2}{\rho_1 + \rho_2} = 4$

$\rho_1\rho_2 = 18$ ...(ii)

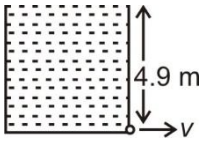
solving (i) and (ii)

$\rho_1 = 6$, $\rho_2 = 3$

27. Answer (4)

Hint : Use Bernoulli's principle.

Sol. :



$P_0 + \rho gh = P_0 + \frac{1}{2}\rho v^2$

$v = \sqrt{2gh}$

$= \sqrt{2 \times 9.8 \times 4.9}$

= 9.8 m/s

Rate of flow of water = $Av = 10^{-6} \times 9.8$

$= 9.8 \times 10^{-6}$ m^3/s

= 9.8 cm^3/s

28. Answer (2)

Hint and Sol. : For a streamline flow of a liquid velocity of each particle at a particular position is constant.

29. Answer (2)

Hint and Sol. : If the angle of contact is obtuse for an interface then meniscus formed will be convex.

30. Answer (3)

Hint : Buoyant force = $\rho_w Vg$

Sol. : Let σ is the density of solid and ρ is density of water.

$W_1 = \sigma Vg$

$W_2 = (\sigma - \rho)Vg$

$\frac{W_1}{W_2} = \frac{\sigma}{\sigma - \rho}$

$\frac{12}{8} = \frac{\sigma}{\sigma - \rho}$

$12\sigma - 12\rho = 8\sigma$

$4\sigma = 12\rho$

$\frac{\sigma}{\rho} = 3$

31. Answer (1)

Hint : $\left|\frac{\Delta V}{V}\right| = \frac{P}{B}$ and $P = \rho gh$

Sol. : $P = \rho gh = 2800 \times 1000 \times 10$

$= 2.8 \times 10^7$ N/m^2

Fractional compression $\frac{\Delta V}{V} = \frac{P}{B} = \frac{2.8 \times 10^7}{2.2 \times 10^9}$

$= 1.27 \times 10^{-2}$

32. Answer (3)

Hint : $U = \frac{1}{2} F \cdot \Delta \ell$

Sol. : $U = \frac{1}{2} \times 100 \times 10^{-3}$

$= 5 \times 10^{-2}$ J

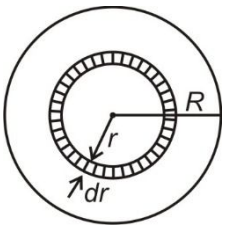
33. Answer (1)

Hint and Sol. : Maximum load depends on material and cross-sectional area of the wire.

34. Answer (4)

Hint : $E = \frac{G\int dm}{r^2}$

Sol. :



$dm = \rho 4\pi r^2 dr$

$= \rho_0 r \cdot 4\pi r^2 dr$

$M = \rho_0 \pi r^4$

For inside points ($r < R$)

$E = -\frac{GM}{r^2} = -\frac{G\rho_0 \pi r^4}{r^2}$

$|E| \propto r^2$ for $r < R$

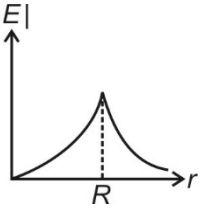
For outside ($r > R$)

$M = \rho_0 \pi R^4$

$E = -\frac{G\rho_0 \pi R^4}{r^2}$

$E \propto \frac{1}{r^2}$ for $r \geq R$

Hence appropriate graph is



35. Answer (3)

Hint : $\vec{E}_G = -\frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$

Sol. : $E_x = -\frac{\partial V}{\partial x}$

$= 2xy + z^2 y$

$E_y = -\frac{\partial V}{\partial y} = x^2 + z^3 + xz^2$

$E_z = -\frac{\partial V}{\partial z} = 3yz^2 + 2xyz$

$\vec{E}_{G(1,1,0)} = \left(2\hat{i} + \hat{j}\right)$ N/kg

36. Answer (1)

Hint : Total energy of satellite in an orbit $= -\frac{GMm}{2r}$

Sol. : $E_1 = -\frac{GMm}{2R}$

$$E_2 = -\frac{GMm}{2(2R)} = -\frac{GmM}{4R}$$

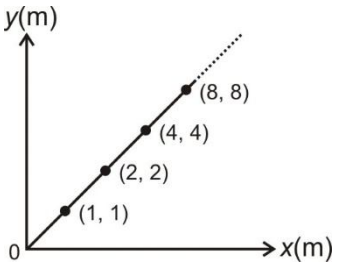
$$\Delta E = -\frac{GMm}{4R} - \left(-\frac{GMm}{2R}\right) = +\frac{GMm}{4R}$$

37. Answer (2)

Hint : $V_{net} = V_1 + V_2 + V_3 + \cdots$

$$V_i = -\frac{GM_i}{r_i}$$

Sol. :



$$V_0 = -GM\left[\frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} + \cdots\right]$$

$$V_0 = -G\left[\frac{1}{\sqrt{2}} + \frac{1}{2\sqrt{2}} + \frac{1}{4\sqrt{2}} + \cdots\right.$$

$$= -\frac{G}{\sqrt{2}}\left[1 + \frac{1}{2} + \frac{1}{4} + \cdots\right.$$

$$= -\frac{G}{\sqrt{2}}\left(\frac{1}{1-\frac{1}{2}}\right)$$

$$= -G\sqrt{2}$$

38. Answer (3)

Hint and Sol. : The effective radius of earth on pole is smaller than at equator. Hence value of *g* at poles is larger than at equator. Also, the value of *g* from poles to equator decreases due to rotation of earth.

39. Answer (4)

Hint : $\vec{E} = -\frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$

Sol. : $\vec{E}_x = -\frac{\partial V}{\partial x}\hat{i} = -\frac{\partial}{\partial x}\left(\frac{x}{x^2+4}\right)\hat{i}$, $\vec{E}_y = 0$, $\vec{E}_z = 0$

$$= -\left[\frac{x^2 + 4 - x(2x)}{(x^2+4)^2}\right]\hat{i} = \frac{x^2 - 4}{(x^2+4)^2}\hat{i}$$

$$\vec{E}(x = 2) = \frac{4-4}{(4+4)^2} = 0$$

40. Answer (3)

Hint and Sol. : Gravitational force between two masses does not depend on medium between them.

41. Answer (2)

Hint : $v_e = \sqrt{\frac{2GM}{R}}$

Sol. : $\frac{v_{e_1}}{v_{e_2}} = \sqrt{\frac{M_1}{M_2}\cdot\frac{R_2}{R_1}} = \sqrt{\frac{3}{2}\times\frac{6}{5}} = \sqrt{\frac{18}{10}}$

$$= \frac{3}{\sqrt{5}}$$

42. Answer (1)

Hint : Use $\Delta U = U_f - U_i$

Sol. : $\Delta U = -\frac{GMm}{5R} - \left(-\frac{GMm}{3R}\right)$

$$= \frac{GMm}{15R}(5-3) = \frac{2GMm}{15R}$$

43. Answer (2)

Hint : Variation in value of *g* due to height.

Sol. : $W = mg = m\cdot\frac{GM}{R^2}$

$$W' = mg' = m\frac{GM}{(R+h)^2}$$

$$\frac{W}{W'} = \left(\frac{R+h}{R}\right)^2$$

$$\frac{1}{0.64} = \left(\frac{R+h}{R}\right)^2$$

$$\frac{R+h}{R} = \frac{1}{0.8}$$

$8R + 8h = 10R$

$$h = \frac{2R}{8} = \frac{R}{4}$$

44. Answer (3)

Hint : According to Kepler's law,

$T^2 \propto R^3$

Sol. : $\frac{T_1}{T_2} = \left(\frac{R_1}{R_2}\right)^{\frac{3}{2}}$

$\frac{T_1}{T_2} = \left(\frac{3R}{9R}\right)^{\frac{3}{2}} = \left(\frac{1}{3}\right)^{\frac{3}{2}}$

$T_2 = 3\sqrt{3}\,T$

45. Answer (4)

Hint : Newton's law of gravitation.

Sol. : $F = \frac{Gm^2}{r^2}$

$F' = \frac{G(2m)\left(\frac{m}{2}\right)}{r'^2} = \frac{Gm^2}{r'^2}$

$\frac{F}{2} = \frac{Gm^2}{r'^2}$

$\frac{Gm^2}{2r^2} = \frac{Gm^2}{r'^2}$

$r' = \sqrt{2}\,r$

[CHEMISTRY]

46. Answer (1)

Hint : Percentage of CaO in Portland cement is 50 – 60%.

47. Answer (3)

Hint : Higher the charge density of the ion higher is the hydration enthalpy.

48. Answer (4)

Hint : KNO_3 does not give NO_2 gas on heating.

Sol. : Group II metal nitrates give NO_2 gas on heating.

$2MNO_3 \xrightarrow{\Delta} 2MNO_2 + O_2$

M = Na, K, Rb

$2LiNO_3 \xrightarrow{\Delta} Li_2O + 2NO_2 + \frac{1}{2}O_2$

$2M(NO_3)_2 \xrightarrow{\Delta} 2MO + 4NO_2 + O_2$

M = Be, Mg, Ca, Sr, Ba.

49. Answer (1)

Hint : In Castner Kellner cell, brine solution is electrolysed using mercury cathode and carbon anode.

50. Answer (2)

Hint : Alkali metal hydroxides are more basic than alkaline earth metal hydroxides.

51. Answer (3)

Hint: Na_2O_2 contains trace amount of superoxide ion which is paramagnetic in nature.

Sol. : Paramagnetic species are generally coloured.

52. Answer (1)

Hint : $E^0_{Li^+/Li} = -3.04\,V$ and $E^0_{Na^+/Na} = -2.7\,V$

Sol.: Lithium is better reducing agent than sodium.

53. Answer (2)

Hint : Suspension of slaked lime ($Ca(OH)_2$) in water is called milk of lime.

54. Answer (3)

Hint : Due to poor shielding effect of *d* orbitals in gallium, the atomic radius is smaller than aluminium.

55. Answer (2)

Hint : Graphite is thermodynamically most stable allotrope of carbon.

56. Answer (4)

Hint : Sum of the oxidation numbers of all elements in a compound is zero.

Sol.: $X(YZ_4)_3$

X = –3

Y = +5

Z = –1

$-3 + \{5 + (-1 \times 4)\} \times 3 = 0$

$\therefore$ Formula of compound = $X(YZ_4)_3$.

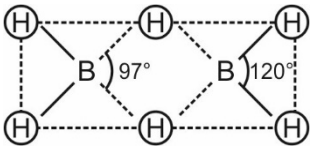
57. Answer (3)

Hint : In Iodine titration, starch is used as indicator which forms a blue coloured complex with iodine.

58. Answer (4)

Hint : B_2H_6 is a three dimensional molecule.

Sol. :



59. Answer (2)

Hint : Higher the lattice enthalpy more stable is the hydride formed.

Sol. : With increasing size of alkaline earth metal cation thermal stability of hydrides decreases.

60. Answer (3)

Hint : Reducing agent decreases the oxidation number of the reacting species.

Sol. : $\overset{-}{I} \rightarrow \overset{+5}{I}O_3^-$

$\overset{-2}{Pb}S \rightarrow \overset{+6}{Pb}SO_4$

$\overset{+7}{MnO_4^-} \rightarrow \overset{+4}{MnO_2}$

$\overset{+2}{S_2}O_3^{2-} \rightarrow \overset{+2.5}{S_4}O_4^{2-}$

MnO_4^- will be converted to MnO_2 by reducing agent.

61. Answer (3)

Hint: Zn will act as cathode and Mg will act as anode.

Sol.: Net cell reaction

$Mg(s) + Zn^{2+}(aq) \rightarrow Mg^{2+}(aq) + Zn(s)$

$E^0_{cell} = E^0_{cathode} - E^0_{anode}$

= (–0.76 + 2.36) V = 1.6 V.

62. Answer (3)

Hint : Boric acid is a Lewis acid.

63. Answer (3)

Hint : Hydrolysis of CH_3SiCl_3 gives cross-linked polymer.

64. Answer (4)

Hint : (N_2 + CO) is called producer gas.

Sol. : (CO + H_2) is called synthesis gas.

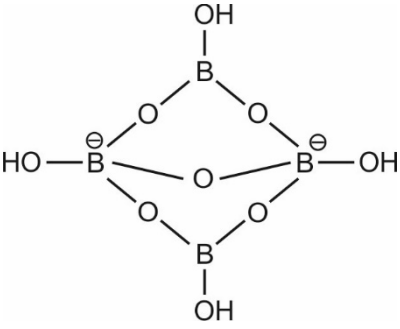
65. Answer (1)

Hint : In group 13 elements, down the group +1 oxidation state becomes more stable due to inert pair effect.

66. Answer (3)

Hint : Borax is $Na_2[B_4O_5(OH)_4] \cdot 8H_2O$

Sol. :



Water of crystallization in borax molecule is 8.

67. Answer (1)

Hint : Back donation of electrons in BF_3 is maximum.

Sol. : As the size of orbital of halogens increases, back donation of electrons to B atom decreases. Hence Lewis acidity order is $BF_3 < BCl_3 < BBr_3$.

68. Answer (3)

Hint : Asbestos is a chain silicate.

69. Answer (1)

Hint : GeO is an acidic oxide.

Sol. : PbO_2 is an amphoteric oxide.

70. Answer (4)

Hint: The species which contains vacant orbital is called Lewis acid.

71. Answer (2)

Hint : Graphite and boron nitride have sheet like structure.

72. Answer (2)

Hint : Down the group +2 oxidation state is more stable due to inert pair effect.

73. Answer (2)

Hint : Soda ash is Na_2CO_3 and Glauber's salt is $Na_2SO_4 \cdot 10H_2O$.

74. Answer (3)

Hint : $MgCl_2$ and LiCl both are deliquescent solids

Sol. : Both LiCl and $MgCl_2$ are deliquescent and crystallise from aqueous solution as hydrate, $LiCl \cdot 2H_2O$ and $MgCl_2 \cdot 8H_2O$.

75. Answer (4)

Hint : Alkali metal carbonates are thermally more stable than alkaline earth metal carbonates.

Sol. : For both alkali metal and alkaline earth metal carbonates the stability increases down the group.

76. Answer (3)

Hint : Potassium ions are most abundant cations within cell fluids.

77. Answer (2)

Hint : In the vapour phase $BeCl_2$ forms a chloro-bridged dimer, which dissociates into the linear monomer at high temperatures of the order of 1200 K.

78. Answer (4)

Hint : Moving down the group hydration enthalpy of group II elements decreases whereas lattice enthalpy remains almost constant.

Sol. : For $BaSO_4$ lattice enthalpy is higher than hydration enthalpy.

79. Answer (3)

Hint : Al_2O_3 is an amphoteric oxide

Sol. : Al_2O_3 is an amphoteric oxide while K_2O, Li_2O and MgO are basic oxides.

$2NaOH + Al_2O_3 \rightarrow 2NaAlO_2 + H_2O$

80. Answer (3)

Hint : Standard reduction potential of Cu^{2+}/Cu couple is 0.34 V.

Sol. : Metals having positive standard reduction potential value, do not liberate H_2 gas on reaction with dil HCl.

81. Answer (3)

Hint : H_2O_2 is used as both oxidising and reducing agent.

Sol. : $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

$I_2 + H_2O_2 + 2\bar{O}H \rightarrow 2I^- + 2H_2O + O_2$

82. Answer (4)

Hint : Clark's method is used to remove temporary hardness of water.

83. Answer (3)

Hint : $Al_4C_3 + 12D_2O \rightarrow 3CD_4 + 4Al(OD)_3$

84. Answer (1)

Hint : Volume strength of H_2O_2 = 11.2 × molarity (M)

16.8 = 11.2 × M

Molarity = $\frac{16.8}{11.2} = 1.5\,M$

85. Answer (3)

Hint : Oxidation number of H in N_3H is +1.

Sol. : Oxidation number of N in N_3H is $-\frac{1}{3}$

Oxidation number of S in SO_3^{2-} is +4

Oxidation number Mn in MnO_4^{2-} is +6

86. Answer (3)

Hint : Higher the oxidation potential higher is the reducing power.

87. Answer (2)

Hint : Oxidation state of P in PH_3 is –3

Sol. :

Compound	Oxidation state of phosphorus
PH_3	–3
H_3PO_2	+1
H_3PO_3	+3
H_3PO_4	+5

88. Answer (2)

Hint : *n*-factor of thiosulphate is 8

Sol. :

$8MnO_4^- + 3\overset{+2}{S}_2O_3^{2-} + H_2O \rightarrow 8MnO_2 + 6\overset{+6}{S}O_4^{2-} + 2\bar{O}H$

mole of thiosulphate required per mole of MnO_4^- ion is $\frac{3}{8}$.

89. Answer (4)

Hint : F_2 cannot be oxidised because it is most electronegative element.

Sol.: $\overset{0}{P}_4 + 3\bar{O}H + 3H_2O \rightarrow \overset{-3}{P}H_3 + 3H_2\overset{+1}{P}O_2^-$

$\overset{0}{S}_8 + 12\bar{O}H \rightarrow 4S^{2-} + 2\overset{+2}{S}_2O_3^{2-} + 6H_2O$

$Cl_2 + 2\bar{O}H \rightarrow \overset{+1}{Cl}O^- + Cl^- + H_2O$

$2F_2 + 2\bar{O}H \rightarrow 2\bar{F} + OF_2 + H_2O$

90. Answer (2)

Hint : With increasing size of atom, metallic bonding decreases, hence melting point decreases.

[BIOLOGY]

91. Answer (3)

Hint: Along with few algae, all gymnosperms and angiosperms show diplontic life cycle.

Sol.: *Fucus*, *Wolfia*, *Eucalyptus*, *Gnetum* – Diplontic life cycle

Volvox – Haplontic life cycle

Polysiphonia – Haplo-diplontic life cycle

92. Answer (3)

Hint: Haploid organisms show haplontic life cycle.

Sol.: In the haplontic life cycle, single celled zygote represents the sporophyte.

93. Answer (4)

Sol.: Leaves of conifers have thick cuticle, sunken stomata and are needle shaped to withstand extreme conditions and to prevent water loss.

94. Answer (4)

Hint: Gametophytes in gymnosperms are extremely reduced.

Sol.: Male and female gametophytes of gymnosperms do not have an independent and free living existence.

95. Answer (3)

Hint: Egg apparatus is a part of the female gametophyte (embryosac) of angiosperms.

Sol.: Egg apparatus consists of one egg cell and two synergids.

96. Answer (2)

Sol.: After fertilisation, ovules develop into seeds in angiosperms.

97. Answer (3)

Hint: *Ginkgo biloba* is a living fossil.

Sol.: *Pinus* – Needle shaped leaves
Cycas – Symbiotic association with N_2 – fixing cyanobacteria
Sequoia – Largest gymnosperm

98. Answer (1)

Hint: *Cycas* is a dioecious plant.

Sol.: Stem is unbranched in *Cycas* while branched in *Pinus*.

99. Answer (4)

Hint: Seeds in gymnosperms are naked.

Sol.: In gymnosperms due to absence of fruit, seeds are not covered in fruit wall.

100. Answer (1)

Hint: Macrophyllous leaves are present in ferns.

Sol.: Heterospory and formation of cones are the features associated with *Selaginella*. Being heterosporous it does not forms prothallus.

101. Answer (2)

Hint: Pteridophytes are first terrestrial plants to have vascular tissues.

Sol.: Plant body of pteridophytes is sporophyte which is differentiated into root, stem and leaves. They require water for fertilisation.

102. Answer (2)

Hint: Small, photosynthetic and monoecious gametophyte (prothallus) is formed in homosporous pteridophytes.

Sol.: *Salvinia*, a heterosporous pteridophyte produces male and female gametophyte by the germination of micro and megaspores respectively.

103. Answer (3)

Hint: Rhizoids are multicellular and branched in mosses while liverworts have unicellular and unbranched rhizoids.

Sol.: Mosses generally have more elaborated mechanism of spore dispersal than liverworts. Leafy stage of mosses develops from secondary protonema as lateral bud.

104. Answer (2)

Sol.: *Sphagnum*, a moss provides peat which is used as fuel.

105. Answer (3)

Hint: Dorsiventral and haploid thallus of *Marchantia* has photosynthetic cells.

Sol.: Antheridiophore, gemma cup and rhizoids are haploid structures of *Marchantia* present on its dorsiventral thallus. Capsule is the diploid structure of sporophytic generation.

106. Answer (1)

Hint: Mosses along with lichens are the first organisms to colonise on rocks.

Sol.: Bryophytes in general are of little economic importance but are of great ecological importance.

107. Answer (4)

Hint: Red algae lack motile structures in their life cycle.

Sol.: Both brown and red algae have marine habitat, chlorophyll 'a' pigment and thalloid body. Brown algae produce zoospores as asexual spores while red algae produce non-motile spores.

108. Answer (3)

Hint: Bryophytes lack vascular tissues.

Sol.: Pteridophytes are called vascular cryptogams.

109. Answer (4)

Hint: Red alga *Gelidium* is the source of agar.

Sol.: *Porphyra* – Floridean starch as stored food
Ectocarpus – Haplo-diplontic life cycle
Fucus – Rich source of iodine

110. Answer (2)

Hint: Brown algae show variable shades of brown depending upon the amount of xanthophyll pigment such as fucoxanthin.

Sol.: Brown algae have pyriform gametes with laterally attached flagella. Polysulphated esters are present in cell wall of red algae.

111. Answer (3)

Sol.: Isogamy by fusion of two non-motile gametes is observed in *Spirogyra*.

112. Answer (1)

Hint: Cytotaxonomy is based upon chromosomal structure, number and behaviour.

Sol.: Numerical taxonomy includes hundreds of characters simultaneously and becomes important in the absence of fossil evidence.

113. Answer (3)

Sol.: In artificial classification, vegetative and sexual characters are given equal weightage.

114. Answer (4)

Hint: Classification system given by Bentham and Hooker was a natural system of classification.

Sol.: Natural classification system given by Bentham and Hooker was not based on phylogeny or evolutionary relationships between plants.

115. Answer (2)

Hint: Endodermis of dicot stems is called starch sheath due to storage of starch.

Sol.: Pericycle, vascular bundles and pith are combindly called stele.

116. Answer (4)

Hint: Spring wood is called early wood while autumn wood is also known as late wood.

Sol.: Spring wood has large number of xylary elements, lower density and vessels with wider lumen.

117. Answer (2)

Hint: Mesophyll of dorsiventral leaves is differentiated into two parts.

Sol.: Part of mesophyll towards abaxial epidermis with large number of intercellular spaces is called spongy parenchyma.

118. Answer (1)

Hint: Heartwood is central and older part while sapwood is younger and peripheral part of secondary xylem.

Sol.: Heartwood is hard and durable part of wood. It has deposition of different organic substances and is resistant to the attack of microorganisms. Sapwood is the water conducting, peripheral part of wood.

119. Answer (1)

Sol.: Among the vascular plants, presence of sieve tubes is a feature of angiosperms only.

120. Answer (2)

Hint: Vascular cambium in dicot roots is formed at the time of secondary growth.

Sol.: In dicot roots, vascular cambium is formed by dedifferentiation of pericycle cells above the protoxylem and conjunctive tissue below primary phloem. Hence, the vascular cambium of dicot roots is completely secondary in origin.

121. Answer (3)

Hint: Bulliform cells are specific epidermal cells present in grass leaves.

Sol.: Bulliform cells are large sized, empty & colourless cells, present on adaxial epidermis of grass leaves.

122. Answer (2)

Hint: Vascular bundles of maize stem lack cambium.

Sol.: In maize stem, bundles sheath is sclerenchymatous, vascular bundles are scattered in ground tissue and larger are towards the centre and smaller towards periphery.

123. Answer (4)

Hint: Bark is non-technical term used for all the tissues which are exterior to vascular cambium.

Sol.: Secondary xylem or wood is formed inner to the vascular cambium which is not the constituent of bark.

124. Answer (3)

Hint: Cell wall of root endodermal cells is impermeable to water because of the deposition of waxy substance.

Sol.: Waxy substance suberin is deposited in the form of casparian strips in root endodermal cells.

125. Answer (1)

Hint: Open vascular bundles have cambium in them.

Sol.: Conjoint-collateral vascular bundles are present in dicot stem, monocot stem, dicot leaves and monocot leaves but out of them vascular bundles of only dicot stem have cambium hence they are of open type.

126. Answer (4)

Hint: Water containing cavities are present in vascular bundles of monocot stem

Sol.: Presence of collenchymatous hypodermis is an exclusive feature of dicot stems while presence of radial vascular bundles is the feature associated with roots. Occurrence of well developed pith is common between both monocot root and dicot stem.

127. Answer (2)

Sol.: Vascular tissues i.e. xylem and phloem constitute vascular tissue system.

128. Answer (4)

Hint: Root epidermis cells lack covering of cuticle at their outer surface.

Sol.: Epidermis is generally single layered, composed of parenchymatous cells and its cells lack intercellular space.

129. Answer (1)

Sol.: Monocots usually lack phloem parenchyma.

130. Answer (3)

Hint: Thick inner wall is present in the guard cells of stomata in dicots.

Sol.: Guard cells contain chloroplasts, surrounds stomatal aperture and are of dumb – bell shaped in grasses.

131. Answer (2)

Hint: Young dicot stem has living mechanical tissue.

Sol.: Hypodermis of young dicot stem is composed of collenchyma which is involved in photosynthesis and in providing mechanical support.

132. Answer (4)

Hint: First formed primary xylem is called protoxylem.

Sol.: Protoxylem lies towards periphery in radial vascular bundle of roots which is called exarch arrangement of xylem.

133. Answer (2)

Hint: Secondary meristems are originated during the secondary growth via dedifferentiation while primary meristems are present during the early growth of a plant.

Sol.: Intrafasicular cambium present in the conjoint vascular bundles is a lateral meristem of primary origin.

134. Answer (3)

Sol.: Tracheids and vessels both are dead, lignified and water conducting part of xylem. Vessels have perforated end plates.

135. Answer (3)

Sol.: Sclereids are part of sclerenchyma which is a dead mechanical tissue.

136. Answer (2)

Hint : Hormone related to adrenal gland.

Sol. : Adrenaline/epinephrine/emergency hormone is secreted by adrenal medulla. Adrenaline stimulates elevation of blood glucose by converting liver glycogen to glucose, increase in oxygen consumption *etc*.

137. Answer (1)

Hint : Immunity which involves differentiation of T-lymphocytes.

Sol. : Thymus gland secretes thymosin which helps in development and maturation of T cells.

138. Answer (1)

Hint : Hormone released from pituitary gland.

Sol. : Hypersecretion of GH in adults leads to Acromegaly. Deficiency of corticoids (Glucocorticoid + mineralocorticoid) leads to Addison's disease. Hyper or hyposecretion of thyroxine can be associated with enlargement of thyroid gland called goitre. Insulin deficiency leads to diabetes mellitus.

139. Answer (3)

Hint : Gene hormone complex activates central dogma of the cell.

Sol. : Steroid hormones directly enter into the cell and bind with intracellular receptors in nucleus to form hormone receptor complex which interacts with the genetic material.

140. Answer (2)

Hint : Hormone released by pineal gland.

Sol. : Melatonin regulates the 24 hours (diurnal) rhythm of our body. It helps in maintaining the normal rhythms of sleep-wake cycle and body temperature.

141. Answer (1)

Hint : Hormone also known as milk let down hormone.

Sol. : Milk ejection reflex is caused by combined neurogenic and hormonal reflex that involve release of oxytocin from posterior pituitary gland. Foetal ejection reflex triggers release of oxytocin from the maternal posterior lobe of pituitary gland. Oxytocin acts on the uterine muscles and causes stronger uterine contractions to induce labor pain.

142. Answer (1)

Hint : Mechanism of action of a proteinaceous hormone.

Sol. : 'P' represents the extra cellular receptors present on the cell surface that form a hormone receptor complex which brings about conformational changes in the cytoplasmic part of the receptor. 'Q' is a hormone such as FSH that cannot cross lipid bilayer therefore it interacts with the membrane bound receptors and does not enter the target cell.

143. Answer (1)

Hint : Part of forebrain.

Sol. : Cerebrum and cerebellum are not part of brain stem. Midbrain and hindbrain form the brain stem. The hindbrain comprises pons, cerebellum and medulla oblongata.

144. Answer (3)

Hint : This pump maintains the electrochemical gradient between ICF and ECF.

Sol. : In resting state, voltage gated Na^+ and K^+ channels are closed. Sodium-potassium pumps require energy to transport $3Na^+$ outwards for $2K^+$ into the axoplasm because sodium-potassium pump works against the concentration gradient of Na^+ and K^+, whereas the Na^+ and K^+ leaky ion channels transport ions from high to low concentrations.

145. Answer (2)

Hint : Disorder is also known as nearsightedness.

Sol. : Myopia or nearsightedness defect can be removed by using concave glasses. In hypermetropia or longsightedness, person can see distant objects clearly, but not those which are closer. This is due to antero-posterior shortening of the eyeball, so that the image is formed behind the yellow spot. The defect can be overcome by using convex lens.

146. Answer (1)

Hint : Cells which have receptors for light.

Sol. : Next to the layer of photoreceptor cells is the intermediate layer of short-sensory bipolar cells. Inner to layer of bipolar cells is the layer of retinal ganglion cells.

147. Answer (1)

Hint : Part of forebrain.

Sol. : Multipolar neurons are present in cerebral cortex. Bipolar neurons are found in the retina of the eye. Unipolar neurons are found usually in the early embryonic stage. Pseudounipolar neuron found in dorsal root ganglion of spinal nerve.

148. Answer (4)

Hint : Lobe which is located near the ear.

Sol. : Temporal lobe helps in decoding and interpretation of sound. The parietal lobe is where feelings about touch, hot and cold and pain are registered. The occipital lobe responds to the sensation of light. The voluntary motor activities are under the control of frontal lobe of cerebrum.

149. Answer (3)

Hint : Layer whose latin translates into soft mother.

Sol. : Dura mater is the outer layer of the cranial meninges. It is thick and tough layer made up of tough fibrous tissue. Arachnoid is very thin middle layer made up of delicate connective tissue.

150. Answer (2)

Hint : Part of brain which has centre controlling urge for drinking water.

Sol. : Hypothalamus is the part of forebrain. Eustachian tube equalizes air pressure on either side of tympanic membrane.

151. Answer (3)

Hint : Perikaryon is a part of this cell.

Sol. : Nerve cells have cyton, dendrites, axon and Nodes of Ranvier as characteristic structures.

152. Answer (2)

Hint : Schneiderian membrane.

Sol. : Bowman's gland secrete mucus. Meibomian glands are modified sebaceous (oil) glands which are present along the edges of the eyelids. They produce an oily secretion which serves to lubricate the corneal surface and forms a thin layer of tears over the cornea.

153. Answer (1)

Hint : Function of Iridial muscles.

Sol. : Sympathetic nervous system dilates pupil while parasympathetic nervous system constricts the pupil. Sympathetic nervous system inhibits secretion of pancreatic juice, reduces bile secretion and raises blood pressure.

154. Answer (4)

Hint : Inhibitory neurotransmitter.

Sol. : Acetylcholine, epinephrine, norepinephrine and glutamate are excitatory neurotransmitters.

155. Answer (4)

Hint : Neurilemma is absent in neurons of CNS.

Sol. : Oligodendrocytes are with few protoplasmic processes and form myelin sheath in CNS. In the absence of Schwann cells, myelin is formed by the spiral wrapping of nerve fibres by processes of oligodendrocytes. In PNS, Schwann cells form the myelin sheath.

156. Answer (2)

Hint : Structures associated with projecting ridge in the saccule and utricle.

Sol. : The otolith organ maintains the static balance of the body. Otolith organ consists of two structures *i.e.* saccule and utricle. The cristae in the three semicircular canals maintain the dynamic balance of the body. Both static as well as the dynamic balance are maintained by the vestibular apparatus.

157. Answer (1)

Hint : Vascularization refers to presence of blood vessels.

Sol. : Avascular nature of cornea helps in transplantation.

158. Answer (2)

Hint : Endoplasmic reticulum.

Sol. : Calcium ions are stored in cisternae of sarcoplasmic reticulum.

159. Answer (4)

Hint : Invaginations of sarcolemma.

Sol. : Troponin T is the binding site for tropomyosin. Troponin C is the binding site for calcium. Troponin is constituted by three subunits I, T and C.

160. Answer (1)

Hint : Bone formed by ossification of tendon.

Sol. : Knee cap *i.e*. patella is an example of sesamoid bone. Sesamoid bones are formed in certain tendons at the joints.

161. Answer (3)

Hint : They are paired structure.

Sol. : Glenoid cavity of scapula articulates with head of humerus to form the shoulder joint.

162. Answer (2)

Hint : Longest bone of the body.

Sol. : Femur is bone of hind limb and a part of appendicular skeleton.

163. Answer (3)

Hint : Divalent ion which is also present in chlorophyll.

Sol. : The G-actins polymerise to form F-actin in the presence of Mg^{2+} ions. Na^{+} and K^{+} ions are essential for impulse transmission.

164. Answer (1)

Hint : ANS controls the smooth muscle fibres.

Sol. : Nonstriated or smooth muscle fibres are innervated by autonomic nervous system while striated or skeletal muscle fibres are innervated by branches from cranial and spinal nerves (Somatic neural system).

165. Answer (2)

Hint : Cells which are a derivative of monocytes.

Sol. : Leucocytes and macrophages engulf the antigens or pathogens through pseudopodia. Spermatozoa exhibit flagellar movement.

166. Answer (1)

Hint : Z line bisects the I band.

Sol. : A sarcomere comprises a single A-band and half of each adjacent I-band. The part of myofibril between two successive Z-lines is called sarcomere.

167. Answer (1)

Hint : Vertebrosternal ribs are true ribs.

Sol. : There are seven pairs of vertebrosternal, three pairs of vertebrochondral and two pairs of vertebral ribs in humans. Vertebrochondral ribs are 8^{th}, 9^{th} & 10^{th} pair.

168. Answer (2)

Hint : Protein coded by largest human gene.

Sol. : In muscular dystrophy, due to absence of dystrophin protein, tension generated by sarcomere is not transmitted to tendons. Dislocation is a displacement of the articular surface of a joint. Osteoarthritis is a joint disease characterised by the degeneration of articular cartilage and proliferation of new bones.

169. Answer (4)

Hint : Structure that not only exhibits neural activity but also controls endocrine functions.

Sol. : Hypothalamus is the thermoregulatory centre in our brain. Cerebellum coordinates locomotory activities in the body. Medulla oblongata contains centres which control respiration, cardiovascular reflexes and gastric secretions.

170. Answer (3)

Hint : Impulse transmission through a neuron.

Sol. : Stimulus from the environment is detected by afferent processes called dendrites. The stimulus acquired is transmitted in the form of electrical impulse by efferent process called axon.

171. Answer (2)

Hint : Disease in which bone loses its mineral deposits.

Sol. : Decreased level of estrogen is a common cause of osteoporosis in females at menopause. Myasthenia gravis is an autoimmune disorder that affects neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscles.

Gout is inflammation of joints due to accumulation of uric acid crystals.

172. Answer (4)

Hint : Joint between wrist bones.

Sol. : The eight bones of the wrist in human are called carpals. Gliding joint is present between wrist bones. Hinge joint is present between phalanges.

173. Answer (4)

Hint : Monosynaptic neuronal activity.

Sol. : Rods are very sensitive in dim light. Cones are very sensitive and operate in day light. Depolarisation of sensory hair cells present in cochlea takes place by opening of mechanical gated K^{+} channels.

174. Answer (3)

Hint : Structure where ribs are attached.

Sol. : Thymus gland is a lobular structure located between lungs behind sternum on the ventral side of aorta.

175. Answer (2)

Hint : Hormone acts as messenger between cells.

Sol. : Hormones act as intercellular messengers and are chemicals produced by endocrine glands.

176. Answer (1)

Hint : Structure commonly known as wind pipe.

Sol. : Thyroid gland is composed of two lateral lobes which are located on either side of trachea. These lobes are interconnected with a thin flap of connective tissue called isthmus.

177. Answer (2)

Hint : Hormone secreted by cells of PCT.

Sol. : PTH stimulates the kidney to release calcitriol by action of hydroxylase enzyme in nephron.

178. Answer (1)

Hint : This term represents decrease in blood sugar level.

Sol. : Glucocorticoids synthesize glucose from amino acids and glycerol. They release fatty acids in blood and degrade proteins within the cells.

179. Answer (2)

Hint : Hormone released from adrenal cortex.

Sol. : Iodothyronines - Thyroid hormone.

Steroidal hormones - Cortisol, testosterone, estradiol, progesterone etc. Proteinaceous hormones include insulin, glucagon, TCT, pituitary hormones and hypothalamic hormones.

180. Answer (4)

Hint : Vasopressin is also known as antidiuretic hormone.

Sol. : Vasopressin reduces water loss from the body. It prevents diuresis and acts mainly on kidneys by stimulating the reabsorption of water and electrolytes.