

## All India Aakash Test Series for NEET - 2020

**OPEN MOCK TEST - I (Code-A)**

Test Date : 09/02/2020

**ANSWERS**

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

**HINTS & SOLUTIONS****[PHYSICS]**

1. Answer (4)

**Hint :** Propagation of error in multiplication and division**Sol. :**

$$\frac{\Delta D}{D} \times 100 = \frac{\Delta A}{A} \times 100 + 2 \frac{\Delta B}{B} \times 100 + \frac{2}{3} \frac{\Delta C}{C} \times 100$$

$$= 1\% + 4\% + 1\% = 6\%$$

2. Answer (4)

**Hint :** Time period ( $T$ ) =  $\frac{2\pi R}{v}$  and  $\theta = \omega t$ **Sol. :** Time period of circular motion =  $\frac{10}{\pi} \times \frac{2\pi}{5} = 4$  s. In one time period (in uniform circular motion) the change in velocity is zero.

3. Answer (1)

**Hint :** Use Ampere's circuital law.

$$\text{Sol. : } B = \begin{cases} \frac{\mu_0 i x}{2\pi R^2} & \text{if } x \leq R \\ \frac{\mu_0 i}{2\pi x} & \text{if } x \geq R \end{cases}$$

Inside wire :  $B \propto x \rightarrow$  Linear graphOutside wire  $B \propto \frac{1}{x} \rightarrow$  hyperbolic graph

4. Answer (3)

**Hint :** K. E. per degree of freedom per molecule

$$= \frac{1}{2} k_B T$$

**Sol. :** Translation kinetic energy =  $\frac{3}{2} k_B T$ Rotational kinetic energy =  $\frac{2}{2} k_B T$ Hence  $KE_T : KE_R = 3 : 2$ 

5. Answer (2)

**Hint :** Motion under gravity.**Sol. :** Time taken to return the top of tower =  $\frac{2u}{g} = \frac{2 \times (10)}{(10)} = 2$  s $\therefore$  at  $t = 1$  s particle is at maximum height ( $H_{\max}$ ) from ground.

$$H_{\max} = 20 + \frac{u^2}{2g} = 20 + \frac{(10)^2}{2 \times (10)} = 25 \text{ m}$$

Since horizontal and vertical accelerations are equal and at maximum height, initial horizontal and vertical velocities are zero.

i.e. Vertical displacement = horizontal displacement

 $\therefore$  horizontal displacement = 25 m

6. Answer (1)

**Hint :**  $P$  must be centre of mass of the system**Sol. :** Calculating location of COM w.r.t.  $C$ .Let mass of each rod be  $m$ 

$$r_{\text{COM}} = \frac{m(0) + (l/2)}{m + m} = \frac{l}{4}$$

7. Answer (2)

**Hint and Sol. :**Since  $PV = nRT$ For isochoric process;  $V$  is constant $\Rightarrow P \propto T$ 

So graph will be straight line passing through origin.

8. Answer (2)

**Hint :** Electric potential due to point charge =  $\frac{kQ}{R}$ **Sol. :** As per law of charge conservation, charge on each drop =  $q = \frac{1C}{1000}$ 

Electric potential

$$V = \frac{1000kq}{r} = \frac{9 \times 10^9}{10} \times \frac{1}{1000} \times 1000$$

 $= 9 \times 10^8 \text{ J/C}$ 

9. Answer (1)

**Hint :** Bernoulli's theorem in horizontal tube

$$P + \frac{1}{2} \rho v^2 = \text{constant and}$$

 $Av = \text{constant}$

**Sol. :**  $A = mx + C$

$$v = \frac{\text{constant}}{A} = \frac{K}{mx + C}$$

$$P + \frac{1}{2}\rho\left(\frac{K}{mx + C}\right)^2 = \text{constant} = a$$

$$P = a - \frac{b}{(mx + C)^2} \text{ (combining various constant in a single constant } b)$$

as  $x$  increases,  $P$  also increases.

10. Answer (1)

**Hint :**  $V = -L \frac{dl}{dt}$

**Sol. :**  $I = I_0 \cos(\omega t)$

$$V = -L \frac{dl}{dt} = LI_0 \omega \sin(\omega t)$$

11. Answer (3)

**Hint and Sol. :**

$$\frac{E_1}{E_2} = \frac{N_1}{N_2}$$

$$\frac{250}{E_2} = \frac{25}{12}$$

$$E_2 = \frac{250 \times 12}{25} = 120 \text{ V}$$

12. Answer (2)

**Hint and Sol. :**

$$U = -\vec{M} \cdot \vec{B}$$

In stable equilibrium  $U = -MB = x$

Torque when magnetic moment is perpendicular to the field  $= \vec{M} \times \vec{B} = MB = \tau$

$$\therefore \tau = -x \text{ or } \left| \frac{\tau}{x} \right| = 1$$

13. Answer (4)

**Hint :** Force due to electromagnetic wave on a perfectly absorbing surface  $= \frac{IA}{C}$

**Sol. :**  $F = \frac{IA}{C} = \frac{300 \times 10^3 \times 10 \times 10^{-4}}{3 \times 10^8} = 1.0 \times 10^{-6} \text{ N}$

$$= 10^{-6} \text{ N} = 1 \mu\text{N}$$

14. Answer (1)

**Hint :** Power ( $P$ )  $\propto AT^4$

**Sol. :**  $\frac{P_2}{P_1} = \frac{A_2 T_2^4}{A_1 T_1^4}$

$$= \left(\frac{1}{2}\right)^2 (2)^4$$

$$= 4$$

$$P_2 = 4P_1 = 4 \times 600 = 2400 \text{ W}$$

15. Answer (1)

**Hint :**  $g' = g - \omega^2 R \cos^2(\theta)$ ;  $\theta$  : angle of latitude

**Sol. :**  $g' = g - \omega^2 R \cos^2(60^\circ) = 0$

$$\omega = \sqrt{\frac{g}{R \cos^2 60^\circ}} = 2\sqrt{\frac{g}{R}}$$

16. Answer (4)

**Hint :** Use conservation of linear momentum.

**Sol. :**  $p_1 = p_2$

$$p_1 = \sqrt{2m_2 k_2}$$

$$k_2 = \frac{p_1^2}{2m_2} = \frac{(20 \times 10)^2}{2 \times 40} = 500 \text{ J}$$

17. Answer (2)

**Hint :**  $(L_1 - L_2)_{dB} = 10 \log_{10} \left( \frac{I_1}{I_2} \right)$

**Sol. :**  $60 - 40 = 10 \log_{10} \left( \frac{I_1}{I_2} \right)$

$$2 = \log_{10} \left( \frac{I_1}{I_2} \right)$$

$$\frac{I_1}{I_2} = 10^2$$

$$\frac{I_1}{I_2} = 100$$

18. Answer (1)

**Hint :**  $\vec{A} = |\vec{A}| \hat{A}$

**Sol. :** Unit vector along the displacement =

$$\frac{(4-2)\hat{i} + (2-1)\hat{j} + (3-1)\hat{k}}{\sqrt{(4-2)^2 + (2-1)^2 + (3-1)^2}}$$

$$= \frac{2\hat{i} + \hat{j} + 2\hat{k}}{\sqrt{4+1+4}} = \frac{2\hat{i} + \hat{j} + 2\hat{k}}{3}$$

$$\vec{v} = 5 \left( \frac{2\hat{i} + \hat{j} + 2\hat{k}}{3} \right) \text{ m/s}$$

19. Answer (3)

**Hint :** Use  $i + e = \delta + A$  and for thin prism  $\delta = (\mu - 1)A$ .

**Sol. :** For normal emergence  $e = 0$

i.e.  $i + 0 = \delta + A$

$$i = (\mu - 1)A + A = \mu A = \frac{5}{3} \times 3^\circ = 5^\circ$$

20. Answer (2)

**Hint :** Maximum acceleration in SHM =  $\omega^2 A$

$$\text{Sol. : } y = \frac{\sin(\omega t)}{\sqrt{2}} + \frac{\cos(\omega t)}{\sqrt{2}}$$

$$\Rightarrow y = 1 \sin\left(\omega t + \frac{\pi}{4}\right)$$

Maximum acceleration =  $\omega^2 A = g$

$$\omega = \sqrt{g} = \sqrt{10} \text{ rad/s}$$

21. Answer (1)

**Hint & Sol. :**

Normal force between  $A$  and  $B$  in case (1) is largest and equal to

$N = \text{Weight of } B + 2N$ .

22. Answer (3)

**Hint and Sol. :**

Electric field calculated using Gauss's law is due to all the charges in the space. It is valid for all types of charge distributions.

In electrostatic condition all points on a conductor are equipotential. So option (3) is correct

23. Answer (1)

**Hint :** Power  $P = i^2 R$

$$\text{Sol. : } \frac{P_b}{P_c} = \frac{i_b^2 R_b}{i_c^2 R_c} = \frac{i^2 R}{\left(\frac{i}{2}\right)^2 R}$$

$$\frac{P_b}{P_c} = \frac{4}{1}$$

24. Answer (3)

$$\text{Hint : } R = \frac{\sqrt{2mK}}{qB}$$

$$\text{Sol. : } \frac{R_f}{R_i} = \sqrt{\frac{K_f}{K_i}} = \sqrt{9}$$

$$R_f = 3 R_i$$

25. Answer (3)

$$\text{Hint : } e_{(\text{induced})} = \frac{B\omega}{2}(\ell^2)$$

$$\text{Sol. : } e_{(\text{induced})} = \frac{B\omega}{2}(\ell^2)$$

$$i = \frac{B\omega\ell^2}{2R} = \frac{(4) \times (6) \times (1)^2}{2 \times (10)}$$

$$= 1.2 \text{ A}$$

26. Answer (2)

**Hint and Sol. :** On cutting along principal axis, power remains unchanged. On cutting in two halves along a line perpendicular to principal axis, power reduces by a factor of 2. So option (2) is incorrect.

27. Answer (2)

$$\text{Hint : Refractive index} = \frac{c}{v_2}$$

$$\text{Sol. : For figure (i) } \mu_{\text{glass}} = \frac{v_{\text{air}}}{v_{\text{glass}}} = \frac{v_{\text{air}} t}{v_{\text{glass}} t} = \frac{b_1}{d_1}$$

$$\text{Similarly } \mu_{\text{water}} = \frac{b_2}{d_2}$$

$$\mu_{\text{glass/water}} = \frac{b_1/d_1}{b_2/d_2} = \frac{b_1 d_2}{b_2 d_1}$$

28. Answer (3)

**Hint :** Contact force = friction force + normal force

$$\text{i.e. } \vec{F}_c = \vec{F}_f + \vec{N}$$

$$\text{Sol. : } \frac{\mu mg}{2} \rightarrow \begin{array}{|c|} \hline m \\ \hline \end{array}$$

Since applied force is equal to limiting friction so the frictional force will be  $\frac{mg}{2}$

$$\text{Contact force} = \sqrt{(mg)^2 + \left(\frac{mg}{2}\right)^2} = \frac{\sqrt{5}}{2} mg$$

29. Answer (1)

**Hint :** In case of steady current, potential difference across inductor is zero.

$$\text{Sol. : } V_A - 2(6) - 10 + 20 - 2(4) = V_B$$

$$V_A - V_B = 10 \text{ V}$$

30. Answer (2)

**Hint :** Kirchhoff's current law.

**Sol. :** Total incoming current = Total outgoing current

$$6 + 2 + 1 + i = 10 + 2$$

$$i = 12 - 9 = 3 \text{ A}$$

31. Answer (4)

**Hint :**  $N = N_0 \left(\frac{1}{2}\right)^n$

**Sol. :**  $\left(\frac{1}{8}\right)^{\text{th}}$  number of nuclei i.e.  $\left(\frac{1}{2}\right)^3$  number of nuclei would remain undecayed in 3 hours.

The final time will be 3 : 05 PM

32. Answer (1)

**Hint and Sol. :** In a spontaneous nuclear reaction, a part of mass is released as energy from the system. Thus the final mass is smaller than initial mass.

33. Answer (2)

**Hint :** Concept of logic gates.

**Sol. :** Characteristic equation.

$$z = xy \cdot \bar{x} = 0 \quad (x \cdot \bar{x} = 0)$$

Now truth table is

X	Y	Z
0	0	0
0	1	0
1	0	0
1	1	0

34. Answer (3)

**Hint and Sol. :** Truth table for AND gate is

Input 1	Input 2	Output 3
0	0	0
0	1	0
1	0	0
1	1	1

35. Answer (1)

**Hint :** Diode  $D_1$  is reversed biased and diode  $D_2$  is forward biased.

**Sol. :** Current will flow through diode  $D_2$  only i.e. through  $40 \Omega$  resistor.

$$\text{current} = \frac{4}{40} = 0.1 \text{ A}$$

36. Answer (4)

**Hint :** Extension in both wires must be same.

**Sol. :**  $Y_A = 75\% Y_B \Rightarrow Y_A = \frac{3}{4} Y_B$

$\Delta l = \frac{Fl}{AY}$  must be same

$$\frac{M_A g l}{A Y_A} = \frac{M_B g l}{A Y_B}$$

$$\frac{M_A}{M_B} = \frac{Y_A}{Y_B} = \frac{3}{4}$$

37. Answer (2)

**Hint :**  $\lambda = \frac{h}{mv} \Rightarrow \lambda \propto \frac{1}{v}$

**Sol. :** At moment of return speed ( $v$ ) = 10 m/s  
at point of maximum height =  $10 \cos 37^\circ$   
= 8 m/s

$$\frac{\lambda_{(\text{maximum height})}}{\lambda_{(\text{point of return})}} = \frac{10}{8} = 5 : 4$$

38. Answer (2)

**Hint and Sol. :** Magnitude of change in velocity is positive and change in magnitude of velocity is negative if speed is decreasing.

39. Answer (1)

**Hint :** Random error  $\propto \frac{1}{\text{number of observations}}$

**Sol. :**  $\frac{e'}{e} = \frac{1}{3}$

$$e' = \frac{e}{3}$$

40. Answer (3)

**Hint and Sol. :**

Lenz's law is based on conservation of energy.

41. Answer (1)

**Hint and Sol. :**

$$E = \frac{\lambda}{2\pi\epsilon_0 X}$$

42. Answer (3)

**Hint and Sol. :**

When  $\theta_1 + \theta_2 = 90^\circ$ , range is same.

43. Answer (3)

**Hint and Sol. :**

Among the given options, frictional force is not a conservative force.

44. Answer (2)

$$\text{Hint : } \vec{v}_{\text{com}} = \frac{m_1\vec{v}_1 + m_2\vec{v}_2}{m_1 + m_2}$$

$$\begin{aligned} \text{Sol. : } \vec{v}_{\text{com}} &= \frac{2(10\hat{i}) + 6(6\hat{j})}{2 + 6} \\ &= \frac{20\hat{i} + 36\hat{j}}{8} \text{ m/s} \\ &= \frac{5\hat{i} + 9\hat{j}}{2} \text{ m/s} \end{aligned}$$

45. Answer (4)

$$\text{Hint : } \frac{C_P}{C_V} = \gamma = 1 + \frac{2}{f}$$

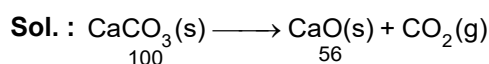
Sol. : For  $N_2$  (diatomic molecule) gas, degrees of freedom ( $f$ ) = 5

$$\therefore \gamma = 1 + \frac{2}{5} = \frac{7}{5}$$

## [CHEMISTRY]

46. Answer (2)

$$\text{Hint : } \% \text{ purity} = \frac{\text{Mass obtained}}{\text{Mass calculated}} \times 100$$



$$20 \text{ g CaCO}_3 \text{ should give } \frac{56}{100} \times 20 = 11.2 \text{ g of CaO.}$$

$$\therefore \% \text{ purity} = \frac{8.4}{11.2} \times 100 = 75\%$$

47. Answer (1)

Hint : Mole fraction of the solute

$$(\chi_{\text{solute}}) = \frac{n_{\text{solute}}}{n_{\text{solute}} + n_{\text{solvent}}}$$

Sol. : 0.5 molal solution means 0.5 mole of solute in 1 kg water.

$$1 \text{ kg water} = \frac{1000}{18} = 55.55 \text{ moles}$$

$$\therefore \chi_{\text{solute}} = \frac{0.5}{0.5 + 55.55} = \frac{1}{112}$$

48. Answer (3)

Hint : Orbital angular momentum  $\mu_\ell = \sqrt{\ell(\ell+1)} \hbar$

Sol. : For a  $p$  sub-shell,  $\ell = 1$

$$\mu_\ell = \sqrt{1(1+1)} \hbar = \sqrt{2} \hbar$$

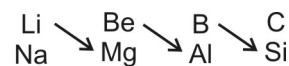
49. Answer (2)

Hint : A  $p$  subshell can have maximum six electrons.

Sol. :  $n = 2$ ,  $l = 1$  represents  $2p$  subshell which can accommodate maximum 6 electrons.

50. Answer (3)

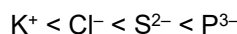
Hint : First three elements of second period show diagonal relationship with elements present diagonally opposite to them.



51. Answer (3)

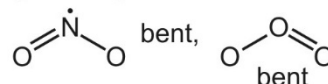
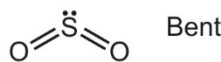
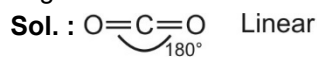
Hint : For isoelectronic species ionic size decreases as the effective nuclear charge increases.

Sol. :  $P^{3-}$  is largest and  $K^+$  is smallest so, correct order of ionic radii is



52. Answer (1)

Hint : The molecule with linear shape has bond angle of  $180^\circ$



53. Answer (4)

Hint : Polar molecule has permanent dipole moment.

54. Answer (3)

$$\text{Hint : } \frac{r_1}{r_2} = \frac{t_2}{t_1} = \sqrt{\frac{M_2}{M_1}}$$

$$\text{Sol. : } \frac{r_{\text{gas}}}{r_{\text{CH}_4}} = \frac{1}{2} = \sqrt{\frac{16}{M_{\text{gas}}}}$$

$$\therefore M_{\text{gas}} = 64$$

55. Answer (2)

$$\text{Hint : } d = \frac{PM}{RT}$$

$$\text{Sol. : } d = \frac{PM}{RT} = \frac{10 \times 17}{0.08 \times 500}$$

$$\therefore d = \frac{170}{40} = 4.25 \text{ g/L}$$

56. Answer (4)

**Hint :**  $|\Delta H_n|$  value is greater for stronger acid.

**Sol. :** Order of decreasing strength of acids is  $B > D > A > C$ .

57. Answer (1)

**Hint :** Extensive properties are mass dependent.

58. Answer (2)

**Hint :** If for  $A \rightleftharpoons B$ ; equilibrium constant is  $K$ , then for  $B \rightleftharpoons A$  equilibrium constant will be  $\frac{1}{K}$ .

**Sol. :**  $N_2 + 3H_2 \rightleftharpoons 2NH_3$ ;  $K$  is the equilibrium constant.

then for the reaction  $NH_3 \rightleftharpoons \frac{1}{2}N_2 + \frac{3}{2}H_2$

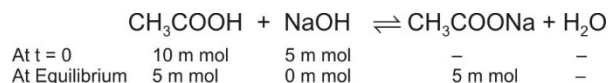
equilibrium constant would be  $\frac{1}{\sqrt{K}} = \frac{1}{K^{1/2}}$ .

59. Answer (1)

**Hint :** pH of an acidic buffer is given by

$$pH = pK_a + \log \frac{[\text{Salt}]}{[\text{Acid}]}$$

**Sol. :**



$$\therefore pH = 4.74 + \log \frac{5}{5} = 4.74$$

60. Answer (3)

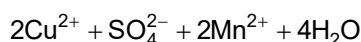
**Hint :** In HCN, oxidation state of N is  $-3$

**Sol. :** In  $HN_3$ , N has  $-\frac{1}{3}$  oxidation state.

In NO, N has  $+2$  oxidation state.

61. Answer (4)

**Hint :**  $2MnO_4^- + Cu_2S + 8H^+ \rightarrow$



62. Answer (1)

**Hint :** Volume strength  $H_2O_2 = 11.2 \times \text{Molarity}$

**Sol. :** Volume strength =  $11.2 \times 0.5 = 5.6 V$

63. Answer (4)

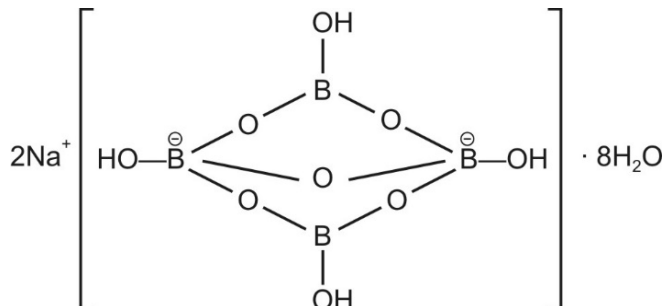
**Hint :** Higher the charge by radius ratio of ion, higher is hydration and hence lower will be the ionic mobility.

64. Answer (3)

**Hint :** In 3-dimensional silicate all four oxygen atoms per  $[SiO_4]^{4-}$  unit are shared

65. Answer (1)

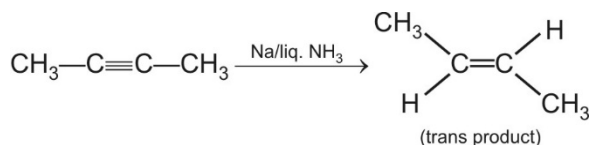
**Hint :** Structure of borax is



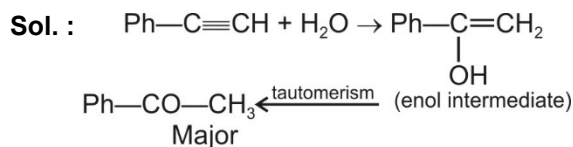
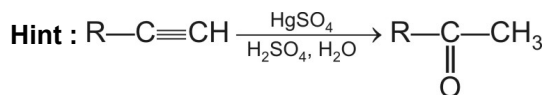
66. Answer (2)

**Hint :** Na in liquid  $NH_3$  is used to get trans alkene from alkyne.

**Sol. :**

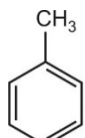


67. Answer (3)



68. Answer (4)

**Hint :** Activated benzene rings give faster reaction with electrophiles.

**Sol. :**  -  $CH_3$  group activates the ring by hyperconjugation.

69. Answer (1)

**Hint :**  $CO_2$ ,  $CH_4$  and  $N_2O$  are greenhouse gases.

**Sol. :**  $N_2$  is not a green house gas.

70. Answer (4)

**Hint :** Luminal is a tranquilizer.

71. Answer (2)

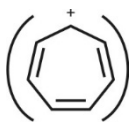
**Hint :** In fcc unit cell total eight tetrahedral voids are found.

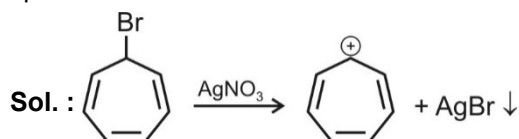
**Sol.** : A forms fcc hence number of A atoms = 4.

B occupies half of the tetrahedral voids, effective number of B atoms = 4.

∴ formula of crystal = AB

72. Answer (3)

**Hint** : Tropylium ion  is an aromatic species.



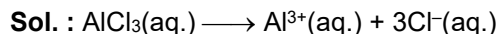
73. Answer (4)

**Hint** : If A—B interactions > A—A or B—B interactions then the mixture shows negative deviation from Raoult's law.

74. Answer (1)

**Hint** : For dissociation van't Hoff factor (i) is

$$i = 1 + (n - 1)\alpha$$



$$n = 4$$

$$\text{So } 2.8 = 1 + (3)\alpha$$

$$3\alpha = 1.8$$

$$\therefore \alpha = 0.6$$

$$\therefore \text{Percentage dissociation } \alpha = 60\%$$

75. Answer (2)

**Hint** :  $E^{\circ}_{\text{cell}}$  is not an additive but  $\Delta G^{\circ}$  is an additive property.

**Sol.** :



(i) - (ii)

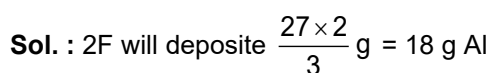
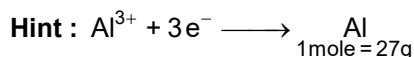


If reduction potential for half cell reaction (iii) is z then,

$$-Fz = 2F_y - 3F_x$$

$$z = (3x - 2y) \text{ V}$$

76. Answer (3)



77. Answer (4)

**Hint** : Conductance depends on number of ions present in the solution.

**Sol.** : Urea, glucose do not ionise, NaCl ionises to give two ions while  $\text{Ba}(\text{OH})_2$  produced 3 ions on ionisation, hence aq.  $\text{Ba}(\text{OH})_2$  solution will be the best conductor of electric current.

78. Answer (2)

**Hint** : If a reactant is taken in excess, order with respect to this reagent becomes zero.

$$\text{Sol.} : r = K[\text{A}][\text{B}]^2 = K'[\text{B}]^2$$

A is in excess, so rate will depend only on B, hence, order of the reaction becomes 2.

79. Answer (1)

**Hint** : Catalyst increases reaction rates by reducing activation energies of both forward and backward reactions.

**Sol.** : A catalyst does not alter  $\Delta G$  or  $K_{\text{eq}}$  of a reversible reaction.

80. Answer (3)

**Hint** : Gold sol contains particles of various sizes having many atoms. Proteins, starch and nylon are example of macromolecular colloids.

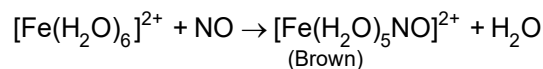
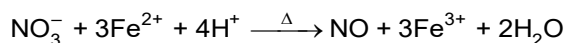
81. Answer (2)

**Hint** : Mond process is used to refine nickel. It is a type of vapour phase refining.

82. Answer (4)

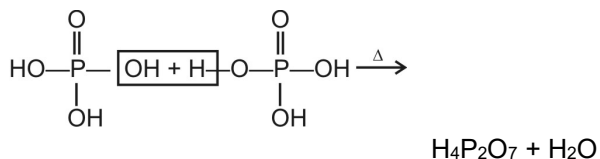
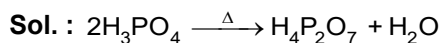
**Hint** : Presence of  $\text{NO}_3^{-}$  ion, in laboratory, is confirmed by a chemical test forming brown ring.

**Sol.** :



83. Answer (3)

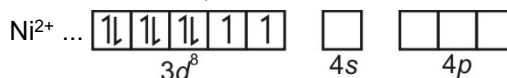
**Hint** :  $\text{H}_2\text{P}_2\text{O}_7$  is called pyrophosphoric acid.



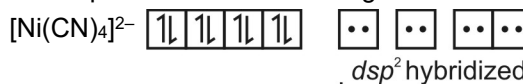
84. Answer (2)

**Hint** :  $[\text{Ni}(\text{CN})_4]^{2-}$  has a square planar structure.

**Sol.** :  $\text{Ni}^{2+} \dots 3d^8, 4s^0$



$\text{Ni}^{2+}$  in presence of  $4\text{CN}^{-}$  ion ligands



So, complex is square planar.

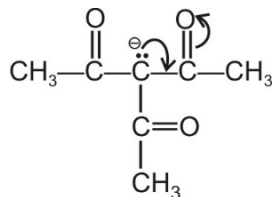
And it is diamagnetic in nature.



85. Answer (2)

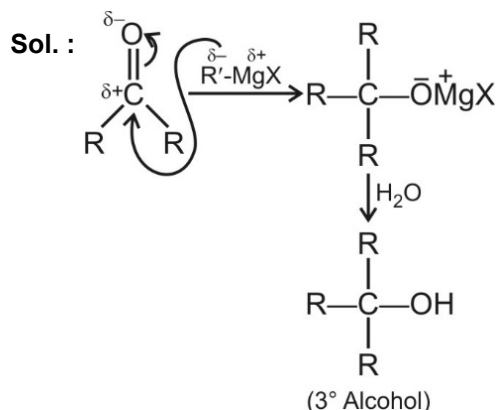
**Hint :**  $-I$ ,  $-R$  effects stabilize carbanions.

**Sol. :**  $-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$  exerts  $-I$  as well as powerful  $-R$  effect in  $(\text{CH}_3\text{CO})_3\overset{\ominus}{\text{C}}$  ion.

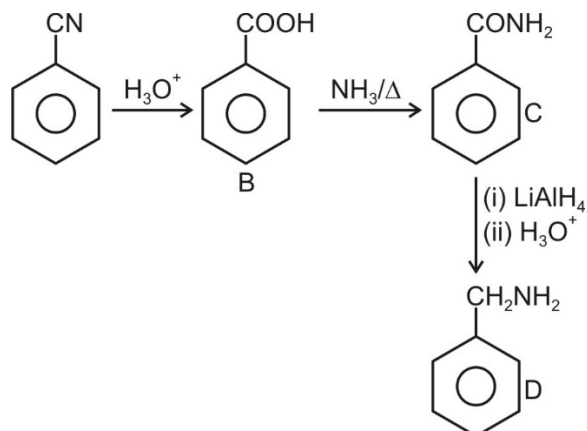


So, above anion is highly resonance stabilized.

86. Answer (3)

**Hint :** Ketones on reaction with  $\text{R-MgX}$  followed by hydrolysis produces a tertiary alcohol.

87. Answer (4)

**Hint :**

88. Answer (4)

**Hint :** PHBV and Nylon-2-Nylon-6 both are biodegradable polymers.

89. Answer (3)

**Hint :** Sucrose is non-reducing sugar.

90. Answer (4)

**Hint :**

Compound	Reaction given by compound
a. Phenol	Reimer-Tiemann
b. Acetic acid	Hell-Volhard-Zelinsky
c. Formaldehyde	Cannizzaro
d. Toluene	Etard

**[BIOLOGY]**

91. Answer (2)

**Hint :** Bulliform cells are found in upper epidermis of some grasses.**Sol. :** In grasses (monocot) leaves are isobilateral and mesophyll is not differentiated into palisade and spongy parenchyma as in dicot leaves.

92. Answer (1)

**Hint :** Tyloses are tracheal plugs found in heart wood.**Sol. :** Tyloses : Balloon shaped swelling of xylem parenchyma cells into lumen of vessels through pit

93. Answer (2)

**Sol. :** Characterisation, identification, classification and nomenclature are the processes which are basic to taxonomy.

94. Answer (2)

**Hint :** Symbol  $\overset{\text{C}}{\text{---}}\overset{\text{A}}{\text{---}}$  represents adhesion of stamens with corolla.**Sol. :**  $\overset{\text{C}}{\text{---}}\overset{\text{A}}{\text{---}}$  represents adhesion of stamens with corolla known as epipetalous stamens.

95. Answer (2)

**Hint :** Homologous structures have same evolutionary origin but different function.**Sol. :** Thorn in *Citrus* and tendril in cucumber are same in origin because both are modified stem but these are different in function. Rest are analogous structures which have different origin but same function.

96. Answer (4)

**Hint :** Endomembrane system includes ER, Golgi complex, lysosome and vacuoles.

**Sol. :** Vacuoles are membrane bound space in cytoplasm but gas vacuole is membraneless, found in prokaryotes. It is not a part of endomembrane system.

97. Answer (3)

**Hint :** Nucleolus is membraneless structure and intermediate filaments are made up of acidic proteins.

**Sol. :** In centrosome, pair of centriole is called diplosome. Histone protein is packaging protein in eukaryotes.

98. Answer (2)

**Sol. :**

- Gram negative bacteria – True pili and presence of L, P, S & M rings in basal body
- Gram positive bacteria – Occurrence of mesosome and absence of outer membrane (outside of the cell wall)

99. Answer (2)

**Sol. :** Floridean starch is stored food of red algae (Rhodophyceae).

100. Answer (4)

**Sol. :** Monocots have parallel venation in leaves and trimerous flowers.

In angiosperms, double fertilization is two events of fertilization as

- Syngamy - Fusion of male and female gametes
- Triple fusion - Fusion of nucleus of male gamete and secondary nucleus.

101. Answer (2)

**Sol. :** *Selaginella* has little leaves (microphyllous)

- Most of the pteridophytes are homosporous.
- Coralloid roots have symbiotic association of  $N_2$  fixing BGA.
- Embryo first developed in bryophytes.

102. Answer (2)

**Hint :** Meiosis II is meant for separation of chromatids (already duplicated material) because it is equational division step of meiosis.

**Sol. :** Before entering in meiosis II, during interkinesis DNA replication does not occur.

103. Answer (3)

**Hint :** Anaphase is actual division phase for genetic material.

**Sol. :** During anaphase, splitting of centromere takes place, as a result chromatids become separate.

104. Answer (1)

**Sol. :** Chemoautotroph - *Nitrobacter*  
Heterotroph - *Lactobacillus*  
Photolithotroph - *Chlorobium*  
Photoorganotroph - *Rhodospirillum*

105. Answer (3)

**Hint :** Archaeobacteria are primitive form of bacteria, can live in harsh habitat. For this adaptation they exhibit less fluidity of cell membrane.

**Sol. :** Due to presence of branched chain lipids, cell membrane fluidity decreases. Archaeobacteria have introns in their genetic material. These features are not found in other forms of bacteria.

106. Answer (4)

**Hint :** In ascomycetes and basidiomycetes sexual spores are produced after meiosis.

**Sol. :** Basidiospores are haploid sexual spores of basidiomycetes.

107. Answer (1)

**Hint :** Basidiomycetes are also called club fungi.

**Sol. :** In club fungi, mycelium is branched and septate.

108. Answer (1)

**Hint :** Statin is obtained from a yeast.

**Sol. :** This yeast is *Monascus purpureus* i.e. a fungus.

109. Answer (2)

**Hint :** During tissue culture, sterilization of vessels, media and instruments by treating with alcohol, autoclaving, heating etc. is called complete sterilization.

**Sol. :** Treatment of explant with specific anti-microbial chemicals is called surface sterilization.

110. Answer (2)

**Hint :** Humus is more or less decomposed organic matter. Decomposition of detritus is slow if it contains lignin, chitin etc.

**Sol. :** Mineralisation is release of inorganic substances from organic matter.

For different complex substances, rate of catabolic actions remain different.

111. Answer (4)

**Hint :** Bad ozone is found in lower atmospheric layer.

**Sol. :** Lower atmospheric layer is troposphere.

112. Answer (3)

**Sol. :** COP – 24 was held in Katowice, Poland in 2018.

113. Answer (2)

**Sol. :** Phloem sap contains sucrose (non-reducing sugar), hormones, amino acid etc.

In endodermal cells, transport proteins function like check point that control movement, quantity and type of solute to xylem.

114. Answer (2)

**Hint :** X - linked inheritance takes place from father to daughter and autosomal inheritance takes place from father to both male and female offsprings.

**Sol. :** This pedigree chart is true for both X-linked and autosomal recessive inheritance.

115. Answer (3)

**Hint :** For multiple allelism

$$\text{Number of genotype} = \frac{n}{2}(n+1)$$

n = Number of multiple alleles

**Sol. :** For four multiple alleles

No. of genotypes = 10

116. Answer (1)

**Hint :** Gametes are result of meiosis in diploid organisms.

**Sol. :** Gametes contain haploid number of chromosomes and each chromosome has many alleles.

117. Answer (4)

**Sol. :** Homogamy promotes self pollination.

118. Answer (3)

**Hint :** Interflowering period occurs in polycarpic plants.

**Sol. :** Interflowering period is a part of mature phase.

119. Answer (3)

**Hint :** Syngamy inside body means internal fertilization.

**Sol. :** In amphibians, external fertilization occurs.

120. Answer (1)

**Hint :** Most of the dicot seeds are non-endospermic.

**Sol. :** In mature castor seeds, endosperm persists.

121. Answer (4)

**Sol. :**  $Zn^{2+}$  is an activator of alcohol dehydrogenase.

122. Answer (3)

**Hint :** Phytohormone ABA functions in the presence of  $CO_2$  for closing of stomata.

**Sol. :** During opening of stomata, ion exchange requires.

In vacuole, potassium malate increases osmotic concentration.

In dark, ABA inhibits  $K^+$  ion uptake by changing the diffusion and permeability of the guard cells for positive ions.

123. Answer (2)

**Hint :** During substrate level phosphorylation in Krebs cycle, ATP is formed.

**Sol. :** In Krebs cycle, substrate level phosphorylation takes place when succinyl CoA is changed into succinic acid.

124. Answer (3)

**Sol. :** Net gain is 2ATP.

Reducing agent is  $NADH + H^+$ .

$CO_2$  is released when pyruvic acid is decarboxylated to form acetaldehyde.

125. Answer (3)

**Hint :** This growth inhibiting PGR is known as anti-GA.

**Sol. :** This plant growth regulator is abscisic acid.

126. Answer (4)

**Sol. :** Precursor of abscisic acid (ABA) is violaxanthin.

127. Answer (1)

**Hint :** This codon codes for amino acid methionine.

**Sol. :** AUG is non-degenerate codon because amino acid methionine is coded by only one codon, i.e., AUG.

128. Answer (2)

**Hint :** It is non-functional part of DNA (genetic material).

**Sol. :** Heterochromatin is transcriptionally inactive. It is darkly stained and densely packed.

129. Answer (4)

**Sol. :** In prokaryotes, DNA gyrase exhibits topoisomerase activity.

130. Answer (1)

**Hint :** Female mosquito is not considered as a parasite because it never spends even a short duration as other parasite do.

**Sol. :** Herbivores are considered as predator on plants.

Fig-wasp relationship – mutualism.

Interaction between clown fish and sea anemone – commensalism.

131. Answer (3)

**Sol. :** The stage of suspended development in zooplankton in a lake is called diapause.

132. Answer (1)

**Hint :** Large population size and low trophic level (more energy) do not favour extinction.

**Sol. :** The species which have large body size are susceptible to extinction.

133. Answer (3)

**Sol. :** At present, 34 hotspots have been recognised in the world.

134. Answer (2)

**Hint :**  $C_2$  cycle is mainly known as photorespiration.

**Sol. :** Glycine is produced in peroxisome.

135. Answer (4)

**Sol. :** PEP synthetase is cold sensitive enzyme.

136. Answer (3)

**Hint :** Animal commonly called the roundworm.

**Sol. :** In asexual reproduction, somatic cells divide mitotically to form new individuals and it is also known as somatogenic reproduction as the new organisms are formed from the somatic part of parental organism. *Hydra*, *Sycon* and *Planaria* can undergo asexual reproduction but not *Ascaris*.

137. Answer (4)

**Hint :** Gametogenesis remains unaffected.

**Sol. :** After vasectomy, synthesis of sex hormones and spermatogenesis is not hampered because there is no effect on testes. However semen is without sperms.

138. Answer (2)

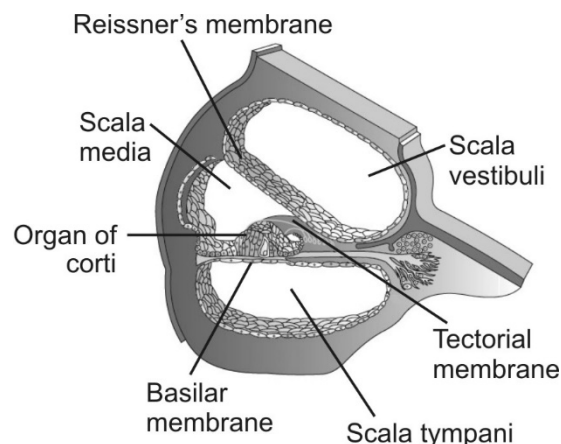
**Hint :** It occurs in most developed countries.

**Sol. :** Demographic transition is a state in which population growth rate becomes zero. Couple protection is the process of bringing eligible couples under family planning measures. Number of children produced by a couple to maintain zero population growth rate is called replacement level. Rate of natural increase is the difference between crude birth rate and crude death rate.

139. Answer (4)

**Hint :** It separates cochlear duct from vestibular duct.

**Sol. :**



140. Answer (1)

**Hint :** Scientist who used killed yeast to prove the theory of biogenesis.

**Sol. :** Louis Pasteur used killed yeasts in 'Swan necked flask' to disprove theory of spontaneous generation. S. L. Miller experimentally proved chemical evolution by using simulating experiment. A. I. Oparin and J. B. S. Haldane proposed the theory of chemical evolution for origin of life on earth.

141. Answer (2)

**Hint :** These cells are connecting link between AMI and CMI.

**Sol. :** In AIDS patients, number of T-4 cells decreases due to their killing by cytotoxic T-cells. T-4 cells secrete interleukins which activate killer T-cells for CMI and B-lymphocytes for AMI.

142. Answer (4)

**Hint :** A resinous mixture produced by honeybees.

**Sol. :** Fries are small fishes collected from nursery ponds which grow as fingerlings in rearing ponds. Enhancement of fish production is called 'Blue revolution'.

143. Answer (1)

**Hint :** Non-coding part of gene is absent in a plasmid.

**Sol. :** Introns are the noncoding part of genes which are not found in plasmids. Plasmids do not contain any vital gene. They are circular, without histone proteins and are always double stranded.

144. Answer (3)

**Hint :** Enzyme which catalyses proliferation of lymphocytes.

**Sol. :** ADA deficiency is caused due to deletion of gene responsible for synthesis of this enzyme. It is responsible for proliferation of lymphocytes, specially T- lymphocytes. Monoamine oxidase causes breakdown of catecholamines and favism is caused due to deficiency of enzyme glucose-6-phosphate dehydrogenase.

145. Answer (4)

**Hint :** Cord like structure which connects muscle to bone.

**Sol. :** Tendon is a dense regular connective tissue formed by collagen fibres and connects a muscle to a particular bone. Bones and cartilages are specialized skeletal connective tissues, whereas blood is a specialized fluid connective tissue.

146. Answer (4)

**Hint :** Occurs due to destruction of acetylcholine receptors.

**Sol. :** Muscular dystrophy is a genetic disorder leading to progressive degeneration of skeletal muscles. Osteoporosis is characterised by decreased bone mass and increased chances of fracture.

147. Answer (3)

**Hint :** Swelling due to water retention.

**Sol. :** Marasmus is a disease in children below one year of age due to protein and energy malnutrition. Thin limbs, prominent ribs with dry, thin and wrinkled skin are characteristic features of Marasmus but pedal oedema is seen in Kwashiorkor.

148. Answer (3)

**Hint :** Centre which regulates respiratory rhythm centre.

**Sol. :** Pneumotaxic centre situated in pons is considered as a part of hind brain whereas hunger, thirst and thermoregulatory centre is situated in the hypothalamus which is a part of prosencephalon (forebrain).

149. Answer (2)

**Hint :** Arteries originate from ventricles and act as distributing channels for blood.

**Sol. :** All arteries carry oxygenated blood except pulmonary and umbilical arteries which carry deoxygenated blood. Blood capillaries may be present in between two arterioles as well as in between two venules. Pulmonary vein does not possess valves.

150. Answer (4)

**Hint :** Glomerular filtrate is converted into urine after reabsorption and secretion.

**Sol. :** Urine formation in kidney occurs by three processes :- Ultrafiltration through filtration slits, selective reabsorption and tubular secretion of various substances.

151. Answer (4)

**Hint :** Cranium is a part of this structure.

**Sol. :** Ball and socket joint present between humerus and pectoral girdle and between head of femur and pelvic girdle. Cartilaginous joints are present between adjacent vertebrae in vertebral column.

152. Answer (3)

**Hint :** All-or-non law.

**Sol. :** During action potential of a nerve fibre both depolarisation and repolarisation are included which occur due to influx of  $\text{Na}^+$  ions and efflux of  $\text{K}^+$  ions respectively. Rapid depolarisation and repolarisation is called spike potential which is equal to change in potential beyond firing level.

153. Answer (1)

**Hint :** This hormone is commonly known as hypercalcemic hormone.

**Sol. :** Hyposecretion of parathormone causes hypocalcemia which results in sustained contraction of a group of muscles known as tetany. Diabetes insipidus is caused due to deficiency of ADH and cretinism is caused due to deficiency of  $\text{T}_4$  and  $\text{T}_3$ . Gigantism is caused due to hypersecretion of growth hormone.

154. Answer (2)

**Hint :** Sponges are monoecious.

**Sol. :** Choanocytes line spongocoel only in Ascon type of canal system. In Sycon type of canal system, they are found in excurrent canal and in leucon and rhagon type of canal system, choanocytes are present within flagellated chambers.

155. Answer (2)

**Hint :** Presence of mammary glands is a unique property of all mammals.

**Sol. :** Presence of mammary glands and diaphragm is a unique property of all mammals. Ear pinna is absent in aquatic mammals. Four chambered heart is also found in birds and crocodiles. Pairs of lungs is present in all vertebrates except fishes. Closed circulation is present in all vertebrates.

156. Answer (3)

**Hint :** This virus is causative agent of "avian influenza".

**Sol. :** H5N1 is a subtype of influenza, a virus causing 'Bird flu'. Pullorum is a bacterial disease caused by bacteria *Salmonella pullorum* and coccidiosis is a protozoan disease caused by *Eimeria*, swine flu is caused by H1N1 viruses.

157. Answer (4)

**Hint :** Release of 16 ova from both ovaries at a time.

**Sol. :** Each ovary is formed by group of 8 ovarioles. Both oviducts unite to form a common oviduct or vagina. Each ootheca contains 16 eggs arranged in two rows.

158. Answer (3)

**Hint :** *Amoeba* is considered immortal.

**Sol. :** Life span of an organism is independent of its size. Unicellular organisms are considered as immortal.

159. Answer (1)

**Hint :** Enzymes present in an acrosome inactivate arrest of ovum in metaphase-II.

**Sol. :** 2<sup>nd</sup> meiotic division is completed just after penetration of a sperm within ovum. As a result 2<sup>nd</sup> polar body is released and secondary oocyte is converted into ootid/egg cell which is followed by karyogamy.

160. Answer (4)

**Hint :** Identify an annelid.

**Sol. :** Earthworm is a hermaphrodite.

161. Answer (4)

**Hint :** Nucleocytoplasmic ratio increases after each successive cleavage.

**Sol. :** Cleavage is a special type of mitosis in which nucleocytoplasmic ratio increases due to decrease in amount of cytoplasm in each cell. So, cytoplasm nearly remains unchanged but genetic content increases as many folds as number of cells in morula stage.

162. Answer (3)

**Hint :** A fertile couple has the ability to conceive.

**Sol. :** Inability of male to copulate due to failure in erection of penis is called impotence. Permanent infertility either in male, in female or in both due to any cause is called sterility. Delivery of a dead child is known as still birth.

163. Answer (3)

**Hint :** Natural selection in which only one extreme phenotype is selected.

**Sol. :** Natural selection which favours only one extreme form of a trait is called directional selection. When intermediate phenotype is selected and extremes are rejected, it is called stabilizing selection. Disruptive selection is rare in which both extreme phenotypes are selected by nature.

164. Answer (2)

**Hint :** One pitch of dsDNA contains 10 base pairs.

**Sol. :** ∴ 1 nm = 10 Å

$$\therefore 34 \text{ nm} = 34 \times 10 = 340 \text{ Å}$$

$$\therefore 34 \text{ Å ds DNA has 10 bp}$$

$$\therefore \text{Total number of bp in } 340 \text{ Å DNA}$$

$$= \frac{10 \times 340}{34} = 100 \text{ bp}$$

165. Answer (2)

**Hint :** Change in gene frequency by chance is genetic drift while ultimate source of variations is mutation.

**Sol. :**

- A. Mutation – source of new alleles
- B. Gene flow – change in allele frequency due to emigration and immigration.
- C. Natural selection – differences in survival and reproduction among various individuals.
- D. Genetic drift – Change in gene frequency by chance in small population.

166. Answer (2)

**Hint :** Selection of recombinants.

**Sol. :** The foreign DNA can be introduced at one of the two antibiotic resistance genes. Thus, one antibiotic resistance gene helps in selecting the transformants while other antibiotic resistance gene gets inactivated due to insertion of foreign DNA and helps in selection of recombinants.

167. Answer (3)

**Hint :** Precursor of Vit-A.

**Sol. :** Golden rice is a transgenic crop which is golden yellow in colour due to presence of  $\beta$ -carotene.  $\beta$ -carotene is converted into Vit-A within liver in presence of hormone thyroxine.

168. Answer (2)

**Hint :** Antibody formed against any antigen is also formed during intrauterine life.

**Sol. :** IgM is responsible for primary immune response whereas IgG is responsible for secondary immune response.

169. Answer (1)

**Hint :** This epithelium is stratified.

**Sol. :** Transitional epithelium or urothelium is a specialized epithelium without basement membrane. So, it has stretchability and can bear tension. It is found in calyces, pelvis, ureters and urinary bladder. Male urethra is internally lined by pseudostratified nonciliated columnar epithelium whereas female urethra is internally lined by stratified cuboidal epithelium.

170. Answer (2)

**Hint :** A compound containing ester bonds.

**Sol. :** On analysis of cellular components, lipids are obtained from the retentate along with biomacromolecules but lipids are not biomacromolecules because their molecular weight is less than 800 daltons. Proteins, starch and glycogen are polymers having molecular weight more than 1000 daltons, so they are considered as biomacromolecules.

171. Answer (1)

**Hint :** These nephridia are enteronephric.

**Sol. :** Septal nephridia are typical nephridia in earthworm and pour their secretions into the intestine. So, they are enteronephric. Integumentary nephridia open on body surface and pharyngeal nephridia open into pharynx and buccal chamber.

172. Answer (2)

**Hint :** These animals show bioluminescence.

**Sol. :** *Ascaris* has a complete digestive tract. *Pheretima* is hermaphrodite and *Rana* exhibits external fertilization in water. *Pleurobrachia* is marine with 8 ciliated comb plates as locomotory structures.

173. Answer (4)

**Hint :** Process similar to detergent like action to decrease surface tension.

**Sol. :** Sodium taurocholate and sodium glycolate are bile salts responsible for emulsification of lipids. Due to emulsification, lipid molecules are broken down into small micelles which are absorbed by enterocytes by simple diffusion.

174. Answer (1)

**Hint :** Negative pressure is also known as suction pressure

**Sol. :** Negative intrapleural pressure pulls walls of lungs towards pleural space which prevents collapse of lungs. Positive intrapleural pressure may cause lungs to collapse as seen in pneumothorax. Negative intrapulmonary pressure causes inspiration and positive intrapulmonary pressure causes expiration.

175. Answer (1)

**Hint :** Isovolumetric term is used for a heart chamber when it behaves as a closed isolated container.

**Sol. :** All four valves associated with both ventricles remains closed for a moment during isovolumetric ventricular systole as well as during isovolumetric ventricular diastole. During joint diastole, all valves of veins in auricle and auriculoventricular valves remains open but semilunar valves remain closed.

176. Answer (3)

**Hint :** Main ion in extracellular fluid.

**Sol. :**  $\text{Na}^+$  ions are reabsorbed in PCT.  $\text{HCO}_3^-$  ions are reabsorbed in proximal part of PCT and secreted in minute quantity in distal part of PCT.  $\text{H}^+$ ,  $\text{NH}_4^+$  ( $\text{NH}_3$ ) and  $\text{K}^+$  are only secreted in PCT.

177. Answer (1)

**Hint :** HMM contains binding site for ATP and actin.

**Sol. :** Attachment of ATP on head of myosin causes structural change in head to break the actin-myosin cross bridge. Hydrolysis of ATP occurs after detachment to activate head again.

178. Answer (3)

**Hint :** Rods are responsible for vision in dim light/dark.

**Sol. :** Rods are responsible for vision in dim light (night) known as scotopic vision whereas cones are responsible for vision in bright light known as photopic vision.

179. Answer (2)

**Hint :** This gland stores hormones in Herring's bodies.

**Sol. :** Hormones which act on the endocrine system but are synthesized within neurosecretory cells or neurons are called neurogenic hormones. Hypothalamus and adrenal medulla secrete neurogenic hormones but neurohypophysis only stores and releases neurogenic hormones. Thyroid gland stores its hormones in an inactive form but they are not neurogenic.

180. Answer (4)

**Hint :** Hormone which has an immunosuppressive effect.

**Sol. :** Cortisol is a fat soluble hormone which can cross the plasma membrane. Its receptors are present in cytoplasm. It lacks second messenger and it functions by acting on genes within the cells to synthesize proteins (enzymes) to regulate various physiological functions.





## All India Aakash Test Series for NEET - 2020

**OPEN MOCK TEST - I (Code-B)**

Test Date : 09/02/2020

**ANSWERS**

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

**HINTS & SOLUTIONS****[PHYSICS]**

1. Answer (4)

$$\text{Hint : } \frac{C_P}{C_V} = \gamma = 1 + \frac{2}{f}$$

**Sol. :** For  $N_2$  (diatomic molecule) gas, degrees of freedom ( $f$ ) = 5

$$\therefore \gamma = 1 + \frac{2}{5} = \frac{7}{5}$$

2. Answer (2)

$$\text{Hint : } \vec{v}_{\text{com}} = \frac{m_1\vec{v}_1 + m_2\vec{v}_2}{m_1 + m_2}$$

$$\begin{aligned} \text{Sol. : } \vec{v}_{\text{com}} &= \frac{2(10\hat{i}) + 6(6\hat{j})}{2 + 6} \\ &= \frac{20\hat{i} + 36\hat{j}}{8} \text{ m/s} \\ &= \frac{5\hat{i} + 9\hat{j}}{2} \text{ m/s} \end{aligned}$$

3. Answer (3)

**Hint and Sol. :**

Among the given options, frictional force is not a conservative force.

4. Answer (3)

**Hint and Sol. :**

When  $\theta_1 + \theta_2 = 90^\circ$ , range is same.

5. Answer (1)

**Hint and Sol. :**

$$E = \frac{\lambda}{2\pi\epsilon_0 x}$$

6. Answer (3)

**Hint and Sol. :**

Lenz's law is based on conservation of energy.

7. Answer (1)

**Hint :** Random error  $\propto \frac{1}{\text{number of observations}}$

$$\text{Sol. : } \frac{e'}{e} = \frac{1}{3}$$

$$e' = \frac{e}{3}$$

8. Answer (2)

**Hint and Sol. :** Magnitude of change in velocity is positive and change in magnitude of velocity is negative if speed is decreasing.

9. Answer (2)

$$\text{Hint : } \lambda = \frac{h}{mv} \Rightarrow \lambda \propto \frac{1}{v}$$

**Sol. :** At moment of return speed ( $v$ ) = 10 m/s  
at point of maximum height =  $10 \cos 37^\circ$   
= 8 m/s

$$\frac{\lambda_{(\text{maximum height})}}{\lambda_{(\text{point of return})}} = \frac{10}{8} = 5 : 4$$

10. Answer (4)

**Hint :** Extension in both wires must be same.

$$\text{Sol. : } Y_A = 75\% Y_B \Rightarrow Y_A = \frac{3}{4} Y_B$$

$$\Delta l = \frac{Fl}{AY} \text{ must be same}$$

$$\frac{M_A g l}{A Y_A} = \frac{M_B g l}{A Y_B}$$

$$\frac{M_A}{M_B} = \frac{Y_A}{Y_B} = \frac{3}{4}$$

11. Answer (1)

**Hint :** Diode  $D_1$  is reversed biased and diode  $D_2$  is forward biased.

**Sol. :** Current will flow through diode  $D_2$  only i.e. through  $40 \Omega$  resistor.

$$\text{current} = \frac{4}{40} = 0.1 \text{ A}$$

12. Answer (3)

**Hint and Sol. :** Truth table for AND gate is

Input 1	Input 2	Output 3
0	0	0
0	1	0
1	0	0
1	1	1

13. Answer (2)

**Hint :** Concept of logic gates.

**Sol.** : Characteristic equation.

$$z = xy \cdot \bar{x} = 0 \quad (x \cdot \bar{x} = 0)$$

Now truth table is

X	Y	Z
0	0	0
0	1	0
1	0	0
1	1	0

14. Answer (1)

**Hint and Sol.** : In a spontaneous nuclear reaction, a part of mass is released as energy from the system. Thus the final mass is smaller than initial mass.

15. Answer (4)

**Hint** :  $N = N_0 \left(\frac{1}{2}\right)^n$

**Sol.** :  $\left(\frac{1}{8}\right)^{\text{th}}$  number of nuclei i.e.  $\left(\frac{1}{2}\right)^3$  number of nuclei would remain undecayed in 3 hours.

The final time will be 3 : 05 PM

16. Answer (2)

**Hint** : Kirchhoff's current law.

**Sol.** : Total incoming current = Total outgoing current

$$6 + 2 + 1 + i = 10 + 2$$

$$i = 12 - 9 = 3 \text{ A}$$

17. Answer (1)

**Hint** : In case of steady current, potential difference across inductor is zero.

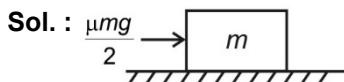
**Sol.** :  $V_A - 2(6) - 10 + 20 - 2(4) = V_B$

$$V_A - V_B = 10 \text{ V}$$

18. Answer (3)

**Hint** : Contact force = friction force + normal force

i.e.  $\vec{F}_c = \vec{F}_f + \vec{N}$



Since applied force is equal to limiting friction so the frictional force will be  $\frac{mg}{2}$

$$\text{Contact force} = \sqrt{(mg)^2 + \left(\frac{mg}{2}\right)^2} = \frac{\sqrt{5}}{2} mg$$

19. Answer (2)

**Hint** : Refractive index  $= \frac{c}{v_2}$

**Sol.** : For figure (i)  $\mu_{\text{glass}} = \frac{v_{\text{air}}}{v_{\text{glass}}} = \frac{v_{\text{air}} t}{v_{\text{glass}} t} = \frac{b_1}{d_1}$

Similarly  $\mu_{\text{water}} = \frac{b_2}{d_2}$

$$\mu_{\text{glass/water}} = \frac{b_1/d_1}{b_2/d_2} = \frac{b_1 d_2}{b_2 d_1}$$

20. Answer (2)

**Hint and Sol.** : On cutting along principal axis, power remains unchanged. On cutting in two halves along a line perpendicular to principal axis, power reduces by a factor of 2. So option (2) is incorrect.

21. Answer (3)

**Hint** :  $e_{(\text{induced})} = \frac{B\omega}{2} (\ell^2)$

**Sol.** :  $e_{(\text{induced})} = \frac{B\omega}{2} (\ell^2)$

$$i = \frac{B\omega\ell^2}{2R} = \frac{(4) \times (6) \times (1)^2}{2 \times (10)}$$

$$= 1.2 \text{ A}$$

22. Answer (3)

**Hint** :  $R = \frac{\sqrt{2mK}}{qB}$

**Sol.** :  $\frac{R_f}{R_i} = \sqrt{\frac{K_f}{K_i}} = \sqrt{9}$

$$R_f = 3 R_i$$

23. Answer (1)

**Hint** : Power  $P = i^2 R$

**Sol.** :  $\frac{P_b}{P_c} = \frac{i_b^2 R_b}{i_c^2 R_c} = \frac{i^2 R}{\left(\frac{i}{2}\right)^2 R}$

$$\frac{P_b}{P_c} = \frac{4}{1}$$

24. Answer (3)

**Hint and Sol. :**

Electric field calculated using Gauss's law is due to all the charges in the space. It is valid for all types of charge distributions.

In electrostatic condition all points on a conductor are equipotential. So option (3) is correct

25. Answer (1)

**Hint & Sol. :**

Normal force between A and B in case (1) is largest and equal to

$$N = \text{Weight of } B + 2N.$$

26. Answer (2)

**Hint :** Maximum acceleration in SHM =  $\omega^2 A$ 

$$\text{Sol. : } y = \frac{\sin(\omega t)}{\sqrt{2}} + \frac{\cos(\omega t)}{\sqrt{2}}$$

$$\Rightarrow y = 1 \sin\left(\omega t + \frac{\pi}{4}\right)$$

Maximum acceleration =  $\omega^2 A = g$

$$\omega = \sqrt{g} = \sqrt{10} \text{ rad/s}$$

27. Answer (3)

**Hint :** Use  $i + e = \delta + A$  and for thin prism  $\delta = (\mu - 1)A$ .

**Sol. :** For normal emergence  $e = 0$

$$\text{i.e. } i + 0 = \delta + A$$

$$i = (\mu - 1)A + A = \mu A = \frac{5}{3} \times 3^\circ$$

$$= 5^\circ$$

28. Answer (1)

**Hint :**  $\vec{A} = |\vec{A}| \hat{A}$ 

**Sol. :** Unit vector along the displacement =

$$\frac{(4-2)\hat{i} + (2-1)\hat{j} + (3-1)\hat{k}}{\sqrt{(4-2)^2 + (2-1)^2 + (3-1)^2}}$$

$$= \frac{2\hat{i} + \hat{j} + 2\hat{k}}{\sqrt{4+1+4}} = \frac{2\hat{i} + \hat{j} + 2\hat{k}}{3}$$

$$\vec{v} = 5 \left( \frac{2\hat{i} + \hat{j} + 2\hat{k}}{3} \right) \text{ m/s}$$

29. Answer (2)

$$\text{Hint : } (L_1 - L_2)_{dB} = 10 \log_{10} \left( \frac{I_1}{I_2} \right)$$

$$\text{Sol. : } 60 - 40 = 10 \log_{10} \left( \frac{I_1}{I_2} \right)$$

$$2 = \log_{10} \left( \frac{I_1}{I_2} \right)$$

$$\frac{I_1}{I_2} = 10^2$$

$$\frac{I_1}{I_2} = 100$$

30. Answer (4)

**Hint :** Use conservation of linear momentum.

$$\text{Sol. : } p_1 = p_2$$

$$p_1 = \sqrt{2m_2 k_2}$$

$$k_2 = \frac{p_1^2}{2m_2} = \frac{(20 \times 10)^2}{2 \times 40} = 500 \text{ J}$$

31. Answer (1)

**Hint :**  $g' = g - \omega^2 R \cos^2(\theta)$ ;  $\theta$  : angle of latitude

$$\text{Sol. : } g' = g - \omega^2 R \cos^2(60^\circ) = 0$$

$$\omega = \sqrt{\frac{g}{R \cos^2 60^\circ}} = 2\sqrt{\frac{g}{R}}$$

32. Answer (1)

**Hint :** Power ( $P$ )  $\propto AT^4$ 

$$\text{Sol. : } \frac{P_2}{P_1} = \frac{A_2 T_2^4}{A_1 T_1^4}$$

$$= \left( \frac{1}{2} \right)^2 (2)^4$$

$$= 4$$

$$P_2 = 4P_1 = 4 \times 600 = 2400 \text{ W}$$

33. Answer (4)

**Hint :** Force due to electromagnetic wave on a perfectly absorbing surface =  $\frac{IA}{C}$

$$\text{Sol. : } F = \frac{IA}{C} = \frac{300 \times 10^3 \times 10 \times 10^{-4}}{3 \times 10^8} = 1.0 \times 10^{-6} \text{ N}$$

$$= 10^{-6} \text{ N} = 1 \mu\text{N}$$

34. Answer (2)

**Hint and Sol. :**

$$U = -\vec{M} \cdot \vec{B}$$

In stable equilibrium  $U = -MB = x$ Torque when magnetic moment is perpendicular to the field =  $\vec{M} \times \vec{B} = MB = \tau$ 

$$\therefore \tau = -x \text{ or } \left| \frac{\tau}{x} \right| = 1$$

35. Answer (3)

**Hint and Sol. :**

$$\frac{E_1}{E_2} = \frac{N_1}{N_2}$$

$$\frac{250}{E_2} = \frac{25}{12}$$

$$E_2 = \frac{250 \times 12}{25} = 120 \text{ V}$$

36. Answer (1)

$$\text{Hint : } V = -L \frac{dl}{dt}$$

$$\text{Sol. : } l = l_0 \cos(\omega t)$$

$$V = -L \frac{dl}{dt} = Ll_0 \omega \sin(\omega t)$$

37. Answer (1)

**Hint :** Bernoulli's theorem in horizontal tube

$$P + \frac{1}{2} \rho v^2 = \text{constant and}$$

$$Av = \text{constant}$$

$$\text{Sol. : } A = mx + C$$

$$v = \frac{\text{constant}}{A} = \frac{K}{mx + C}$$

$$P + \frac{1}{2} \rho \left( \frac{K}{mx + C} \right)^2 = \text{constant} = a$$

$$P = a - \frac{b}{(mx + C)^2} \text{ (combining various constant in a single constant } b)$$

as  $x$  increases,  $P$  also increases.

38. Answer (2)

$$\text{Hint : Electric potential due to point charge} = \frac{kQ}{R}$$

**Sol. :** As per law of charge conservation, charge

$$\text{on each drop} = q = \frac{1 \text{ C}}{1000}$$

Electric potential

$$V = \frac{1000kq}{r} = \frac{9 \times 10^9}{10} \times \frac{1}{1000} \times 1000$$

$$= 9 \times 10^8 \text{ J/C}$$

39. Answer (2)

**Hint and Sol. :**

$$\text{Since } PV = nRT$$

For isochoric process;  $V$  is constant

$$\Rightarrow P \propto T$$

So graph will be straight line passing through origin.

40. Answer (1)

**Hint :**  $P$  must be centre of mass of the system**Sol. :** Calculating location of COM w.r.t. C.Let mass of each rod be  $m$ 

$$r_{\text{COM}} = \frac{m(0) + (l/2)}{m + m} = \frac{l}{4}$$

41. Answer (2)

**Hint :** Motion under gravity.**Sol. :** Time taken to return the top of tower

$$= \frac{2u}{g} = \frac{2 \times (10)}{(10)} = 2 \text{ s}$$

 $\therefore$  at  $t = 1 \text{ s}$  particle is at maximum height ( $H_{\text{max}}$ ) from ground.

$$H_{\text{max}} = 20 + \frac{u^2}{2g} = 20 + \frac{(10)^2}{2 \times (10)} = 25 \text{ m}$$

Since horizontal and vertical accelerations are equal and at maximum height, initial horizontal and vertical velocities are zero.

i.e. Vertical displacement = horizontal displacement

 $\therefore$  horizontal displacement = 25 m

42. Answer (3)

**Hint :** K. E. per degree of freedom per molecule

$$= \frac{1}{2} k_B T$$

$$\text{Sol. : Translation kinetic energy} = \frac{3}{2} k_B T$$

$$\text{Rotational kinetic energy} = \frac{2}{2} k_B T$$

Hence  $\text{KE}_T : \text{KE}_R = 3 : 2$

43. Answer (1)

**Hint :** Use Ampere's circuital law.

$$\text{Sol. : } B = \begin{cases} \frac{\mu_0 i x}{2\pi R^2} & \text{if } x \leq R \\ \frac{\mu_0 i}{2\pi x} & \text{if } x \geq R \end{cases}$$

Inside wire :  $B \propto x \rightarrow$  Linear graphOutside wire  $B \propto \frac{1}{x} \rightarrow$  hyperbolic graph

44. Answer (4)

**Hint :** Time period ( $T$ ) =  $\frac{2\pi R}{v}$  and  $\theta = \omega t$ 

**Sol. :** Time period of circular motion  
 $= \frac{10}{\pi} \times \frac{2\pi}{5} = 4 \text{ s}$ . In one time period (in uniform circular motion) the change in velocity is zero.

45. Answer (4)

**Hint :** Propagation of error in multiplication and division**Sol. :**

$$\frac{\Delta D}{D} \times 100 = \frac{\Delta A}{A} \times 100 + 2 \frac{\Delta B}{B} \times 100 + \frac{2}{3} \frac{\Delta C}{C} \times 100$$

$$= 1\% + 4\% + 1\% = 6\%$$

## [CHEMISTRY]

46. Answer (4)

**Hint :**

Compound	Reaction given by compound
a. Phenol	Reimer-Tiemann
b. Acetic acid	Hell-Volhard-Zelinsky
c. Formaldehyde	Cannizzaro
d. Toluene	Etard

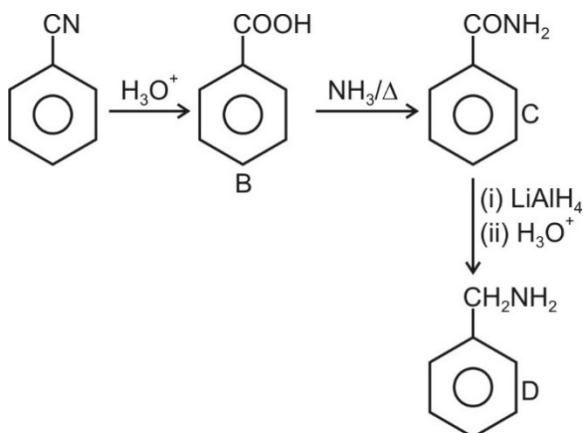
47. Answer (3)

**Hint :** Sucrose is non-reducing sugar.

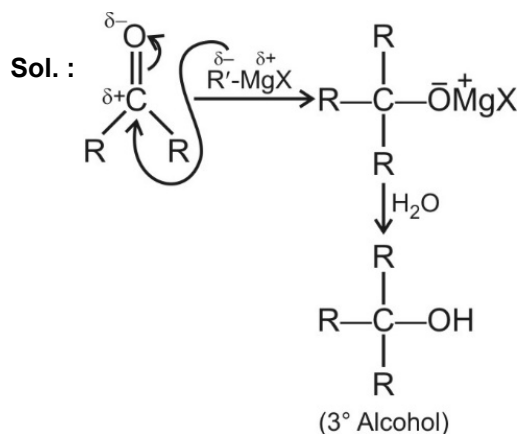
48. Answer (4)

**Hint :** PHBV and Nylon-2-Nylon-6 both are biodegradable polymers.

49. Answer (4)

**Hint :**

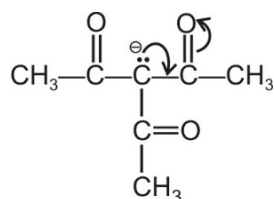
50. Answer (3)

**Hint :** Ketones on reaction with R-MgX followed by hydrolysis produces a tertiary alcohol.

51. Answer (2)

**Hint :** -I, -R effects stabilize carbanions.

**Sol. :**  $-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$  exerts -I as well as powerful -R effect in  $(\text{CH}_3\text{CO})_3\bar{\text{C}}$  ion.

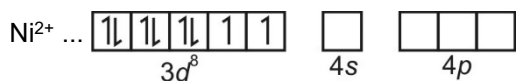


So, above anion is highly resonance stabilized.

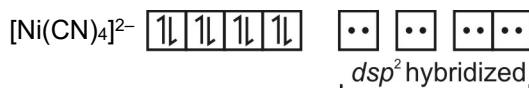
52. Answer (2)

**Hint :**  $[\text{Ni}(\text{CN})_4]^{2-}$  has a square planar structure.

**Sol. :**  $Ni^{2+} \dots 3d^8, 4s^0$



$Ni^{2+}$  in presence of  $4CN^-$  ion ligands

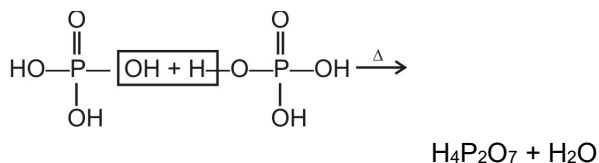
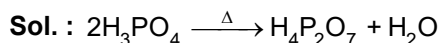


So, complex is square planar.

And it is diamagnetic in nature.

53. Answer (3)

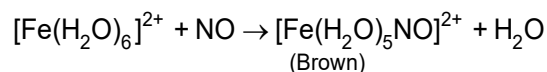
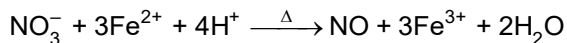
**Hint :**  $H_2P_2O_7$  is called pyrophosphoric acid.



54. Answer (4)

**Hint :** Presence of  $NO_3^-$  ion, in laboratory, is confirmed by a chemical test forming brown ring.

**Sol. :**



55. Answer (2)

**Hint :** Mond process is used to refine nickel. It is a type of vapour phase refining.

56. Answer (3)

**Hint :** Gold sol contains particles of various sizes having many atoms. Proteins, starch and nylon are example of macromolecular colloids.

57. Answer (1)

**Hint :** Catalyst increases reaction rates by reducing activation energies of both forward and backward reactions.

**Sol. :** A catalyst does not alter  $\Delta G$  or  $K_{eq}$  of a reversible reaction.

58. Answer (2)

**Hint :** If a reactant is taken in excess, order with respect to this reagent becomes zero.



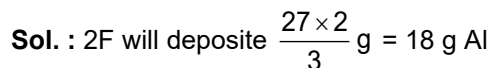
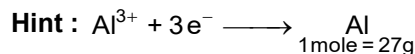
A is in excess, so rate will depend only on B, hence, order of the reaction becomes 2.

59. Answer (4)

**Hint :** Conductance depends on number of ions present in the solution.

**Sol. :** Urea, glucose do not ionise, NaCl ionises to give two ions while  $Ba(OH)_2$  produced 3 ions on ionisation, hence aq.  $Ba(OH)_2$  solution will be the best conductor of electric current.

60. Answer (3)



61. Answer (2)

**Hint :**  $E^\circ_{cell}$  is not an additive but  $\Delta G^\circ$  is an additive property.

**Sol. :**



(i) - (ii)



If reduction potential for half cell reaction (iii) is z then,

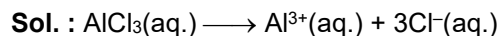
$-Fz = 2Fy - 3Fx$

$z = (3x - 2y) V$

62. Answer (1)

**Hint :** For dissociation van't Hoff factor (i) is

$i = 1 + (n - 1)\alpha$



$n = 4$

So  $2.8 = 1 + (3)\alpha$

$3\alpha = 1.8$


$\therefore \alpha = 0.6$

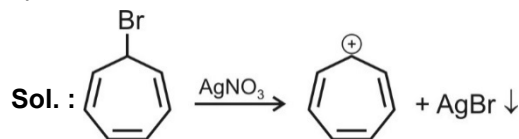
$\therefore$  Percentage dissociation  $\alpha = 60\%$

63. Answer (4)

**Hint :** If A—B interactions  $>$  A—A or B—B interactions then the mixture shows negative deviation from Raoult's law.

64. Answer (3)

**Hint :** Tropylium ion  is an aromatic species.



65. Answer (2)

**Hint :** In fcc unit cell total eight tetrahedral voids are found.

**Sol. :** A forms fcc hence number of A atoms = 4.

B occupies half of the tetrahedral voids, effective number of B atoms = 4.

∴ formula of crystal = AB

66. Answer (4)

**Hint :** Luminal is a tranquilizer.

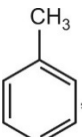
67. Answer (1)

**Hint :** CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O are greenhouse gases.

**Sol. :** N<sub>2</sub> is not a green house gas.

68. Answer (4)

**Hint :** Activated benzene rings give faster reaction with electrophiles.

**Sol. :**  -CH<sub>3</sub> group activates the ring by hyperconjugation.

69. Answer (3)

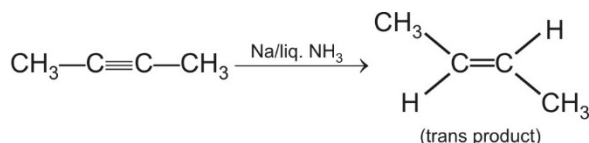
**Hint :**  $R-C\equiv CH \xrightarrow[H_2SO_4, H_2O]{HgSO_4} R-C(=O)-CH_3$

**Sol. :**  $Ph-C\equiv CH + H_2O \rightarrow Ph-C(OH)=CH_2$   
 $Ph-CO-CH_3 \xleftarrow{\text{tautomerism}} Ph-C(OH)=CH_2$  (enol intermediate)  
 Major

70. Answer (2)

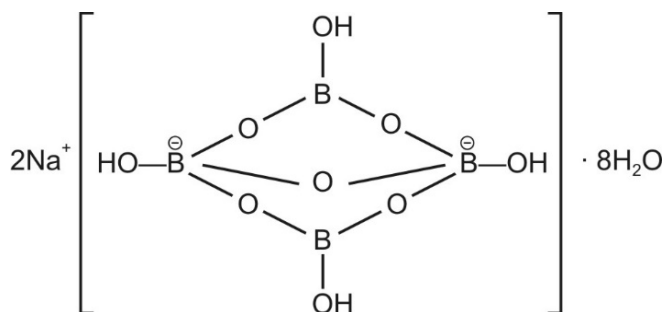
**Hint :** Na in liquid NH<sub>3</sub> is used to get trans alkene from alkyne.

**Sol. :**



71. Answer (1)

**Hint :** Structure of borax is



72. Answer (3)

**Hint :** In 3-dimensional silicate all four oxygen atoms per [SiO<sub>4</sub>]<sup>4-</sup> unit are shared

73. Answer (4)

**Hint :** Higher the charge by radius ratio of ion, higher is hydration and hence lower will be the ionic mobility.

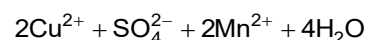
74. Answer (1)

**Hint :** Volume strength H<sub>2</sub>O<sub>2</sub> = 11.2 × Molarity

**Sol. :** Volume strength = 11.2 × 0.5 = 5.6 V

75. Answer (4)

**Hint :**  $2MnO_4^- + Cu_2S + 8H^+ \rightarrow$



76. Answer (3)

**Hint :** In HCN, oxidation state of N is -3

**Sol. :** In HN<sub>3</sub>, N has  $-\frac{1}{3}$  oxidation state.

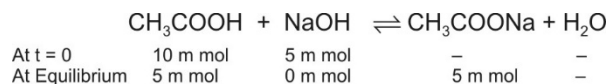
In NO, N has +2 oxidation state.

77. Answer (1)

**Hint :** pH of an acidic buffer is given by

$$pH = pK_a + \log \frac{[\text{Salt}]}{[\text{Acid}]}$$

**Sol. :**



$$\therefore pH = 4.74 + \log \frac{5}{5} = 4.74$$

78. Answer (2)

**Hint :** If for  $A \rightleftharpoons B$ ; equilibrium constant is K, then for  $B \rightleftharpoons A$  equilibrium constant will be  $\frac{1}{K}$ .

**Sol. :**  $N_2 + 3H_2 \rightleftharpoons 2NH_3$ ; K is the equilibrium constant.

then for the reaction  $NH_3 \rightleftharpoons \frac{1}{2}N_2 + \frac{3}{2}H_2$   
 equilibrium constant would be  $\frac{1}{\sqrt{K}} = \frac{1}{K^{1/2}}$ .

79. Answer (1)

**Hint :** Extensive properties are mass dependent.

80. Answer (4)

**Hint :**  $|\Delta H_n|$  value is greater for stronger acid.

**Sol. :** Order of decreasing strength of acids is  $B > D > A > C$ .

81. Answer (2)

**Hint :**  $d = \frac{PM}{RT}$



$$\text{Sol. : } d = \frac{PM}{RT} = \frac{10 \times 17}{0.08 \times 500}$$

$$\therefore d = \frac{170}{40} = 4.25 \text{ g/L}$$

82. Answer (3)

$$\text{Hint : } \frac{r_1}{r_2} = \frac{t_2}{t_1} = \sqrt{\frac{M_2}{M_1}}$$

$$\text{Sol. : } \frac{r_{\text{gas}}}{r_{\text{CH}_4}} = \frac{1}{2} = \sqrt{\frac{16}{M_{\text{gas}}}}$$

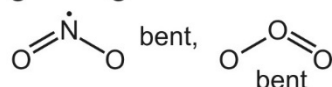
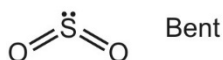
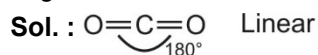
$$\therefore M_{\text{gas}} = 64$$

83. Answer (4)

**Hint :** Polar molecule has permanent dipole moment.

84. Answer (1)

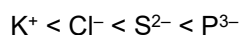
**Hint :** The molecule with linear shape has bond angle of  $180^\circ$



85. Answer (3)

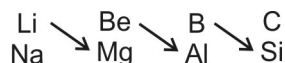
**Hint :** For isoelectronic species ionic size decreases as the effective nuclear charge increases.

**Sol. :**  $\text{P}^{3-}$  is largest and  $\text{K}^+$  is smallest so, correct order of ionic radii is



86. Answer (3)

**Hint :** First three elements of second period show diagonal relationship with elements present diagonally opposite to them.



87. Answer (2)

**Hint :** A  $p$  subshell can have maximum six electrons.

**Sol. :**  $n = 2, l = 1$  represents  $2p$  subshell which can accommodate maximum 6 electrons.

88. Answer (3)

**Hint :** Orbital angular momentum  $\mu_\ell = \sqrt{\ell(\ell+1)} \hbar$

**Sol. :** For a  $p$  sub-shell,  $\ell = 1$

$$\mu_\ell = \sqrt{1(1+1)} \hbar = \sqrt{2} \hbar$$

89. Answer (1)

**Hint :** Mole fraction of the solute

$$(\chi_{\text{solute}}) = \frac{n_{\text{solute}}}{n_{\text{solute}} + n_{\text{solvent}}}$$

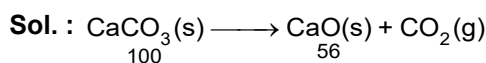
**Sol. :** 0.5 molal solution means 0.5 mole of solute in 1 kg water.

$$1 \text{ kg water} = \frac{1000}{18} = 55.55 \text{ moles}$$

$$\therefore \chi_{\text{solute}} = \frac{0.5}{0.5 + 55.55} = \frac{1}{112}$$

90. Answer (2)

**Hint :** % purity =  $\frac{\text{Mass obtained}}{\text{Mass calculated}} \times 100$



20 g  $\text{CaCO}_3$  should give  $\frac{56}{100} \times 20 = 11.2$  g of  $\text{CaO}$ .

$$\therefore \% \text{ purity} = \frac{8.4}{11.2} \times 100 = 75\%$$

## [BIOLOGY]

91. Answer (4)

**Sol. :** PEP synthetase is cold sensitive enzyme.

92. Answer (2)

**Hint :**  $\text{C}_2$  cycle is mainly known as photorespiration.

**Sol. :** Glycine is produced in peroxisome.

93. Answer (3)

**Sol. :** At present, 34 hotspots have been recognised in the world.

94. Answer (1)

**Hint :** Large population size and low trophic level (more energy) do not favour extinction.

**Sol. :** The species which have large body size are susceptible to extinction.

95. Answer (3)

**Sol. :** The stage of suspended development in zooplankton in a lake is called diapause.

96. Answer (1)

**Hint :** Female mosquito is not considered as a parasite because it never spends even a short duration as other parasite do.

**Sol. :** Herbivores are considered as predator on plants.

Fig-wasp relationship – mutualism.

Interaction between clown fish and sea anemone – commensalism.

97. Answer (4)

**Sol. :** In prokaryotes, DNA gyrase exhibits topoisomerase activity.

98. Answer (2)

**Hint :** It is non-functional part of DNA (genetic material).

**Sol. :** Heterochromatin is transcriptionally inactive. It is darkly stained and densely packed.

99. Answer (1)

**Hint :** This codon codes for amino acid methionine.

**Sol. :** AUG is non-degenerate codon because amino acid methionine is coded by only one codon, *i.e.*, AUG.

100. Answer (4)

**Sol. :** Precursor of abscisic acid (ABA) is violaxanthin.

101. Answer (3)

**Hint :** This growth inhibiting PGR is known as anti-GA.

**Sol. :** This plant growth regulator is abscisic acid.

102. Answer (3)

**Sol. :** Net gain is 2ATP.

Reducing agent is  $\text{NADH} + \text{H}^+$ .

$\text{CO}_2$  is released when pyruvic acid is decarboxylated to form acetaldehyde.

103. Answer (2)

**Hint :** During substrate level phosphorylation in Krebs cycle, ATP is formed.

**Sol. :** In Krebs cycle, substrate level phosphorylation takes place when succinyl CoA is changed into succinic acid.

104. Answer (3)

**Hint :** Phytohormone ABA functions in the presence of  $\text{CO}_2$  for closing of stomata.

**Sol. :** During opening of stomata, ion exchange requires.

In vacuole, potassium malate increases osmotic concentration.

In dark, ABA inhibits  $\text{K}^+$  ion uptake by changing the diffusion and permeability of the guard cells for positive ions.

105. Answer (4)

**Sol. :**  $\text{Zn}^{2+}$  is an activator of alcohol dehydrogenase.

106. Answer (1)

**Hint :** Most of the dicot seeds are non-endospermic.

**Sol. :** In mature castor seeds, endosperm persists.

107. Answer (3)

**Hint :** Syngamy inside body means internal fertilization.

**Sol. :** In amphibians, external fertilization occurs.

108. Answer (3)

**Hint :** Interflowering period occurs in polycarpic plants.

**Sol. :** Interflowering period is a part of mature phase.

109. Answer (4)

**Sol. :** Homogamy promotes self pollination.

110. Answer (1)

**Hint :** Gametes are result of meiosis in diploid organisms.

**Sol. :** Gametes contain haploid number of chromosomes and each chromosome has many alleles.

111. Answer (3)

**Hint :** For multiple allelism

$$\text{Number of genotype} = \frac{n}{2}(n+1)$$

$n$  = Number of multiple alleles

**Sol. :** For four multiple alleles

No. of genotypes = 10

112. Answer (2)

**Hint :** X - linked inheritance takes place from father to daughter and autosomal inheritance takes place from father to both male and female offsprings.

**Sol. :** This pedigree chart is true for both X-linked and autosomal recessive inheritance.

113. Answer (2)

**Sol. :** Phloem sap contains sucrose (non-reducing sugar), hormones, amino acid etc.

In endodermal cells, transport proteins function like check point that control movement, quantity and type of solute to xylem.

114. Answer (3)

**Sol. :** COP – 24 was held in Katowice, Poland in 2018.

115. Answer (4)

**Hint :** Bad ozone is found in lower atmospheric layer.

**Sol. :** Lower atmospheric layer is troposphere.

116. Answer (2)

**Hint :** Humus is more or less decomposed organic matter. Decomposition of detritus is slow if it contains lignin, chitin etc.

**Sol. :** Mineralisation is release of inorganic substances from organic matter.

For different complex substances, rate of catabolic actions remain different.

117. Answer (2)

**Hint :** During tissue culture, sterilization of vessels, media and instruments by treating with alcohol, autoclaving, heating etc. is called complete sterilization.

**Sol. :** Treatment of explant with specific anti-microbial chemicals is called surface sterilization.

118. Answer (1)

**Hint :** Statin is obtained from a yeast.

**Sol. :** This yeast is *Monascus purpureus* i.e. a fungus.

119. Answer (1)

**Hint :** Basidiomycetes are also called club fungi.

**Sol. :** In club fungi, mycelium is branched and septate.

120. Answer (4)

**Hint :** In ascomycetes and basidiomycetes sexual spores are produced after meiosis.

**Sol. :** Basidiospores are haploid sexual spores of basidiomycetes.

121. Answer (3)

**Hint :** Archaeobacteria are primitive form of bacteria, can live in harsh habitat. For this adaptation they exhibit less fluidity of cell membrane.

**Sol. :** Due to presence of branched chain lipids, cell membrane fluidity decreases. Archaeobacteria have introns in their genetic material. These features are not found in other forms of bacteria.

122. Answer (1)

**Sol. :** Chemoautotroph - *Nitrobacter*

Heterotroph - *Lactobacillus*

Photolithotroph - *Chlorobium*

Photoorganotroph - *Rhodospirillum*

123. Answer (3)

**Hint :** Anaphase is actual division phase for genetic material.

**Sol. :** During anaphase, splitting of centromere takes place, as a result chromatids become separate.

124. Answer (2)

**Hint :** Meiosis II is meant for separation of chromatids (already duplicated material) because it is equational division step of meiosis.

**Sol. :** Before entering in meiosis II, during interkinesis DNA replication does not occur.

125. Answer (2)

**Sol. :** *Selaginella* has little leaves (microphyllous)

– Most of the pteridophytes are homosporous.

– Coralloid roots have symbiotic association of  $N_2$  fixing BGA.

– Embryo first developed in bryophytes.

126. Answer (4)

**Sol. :** Monocots have parallel venation in leaves and trimerous flowers.

In angiosperms, double fertilization is two events of fertilization as

(i) Syngamy - Fusion of male and female gametes

(ii) Triple fusion - Fusion of nucleus of male gamete and secondary nucleus.

127. Answer (2)

**Sol. :** Floridean starch is stored food of red algae (Rhodophyceae).

128. Answer (2)

**Sol. :**

a. Gram negative bacteria – True pili and presence of L, P, S & M rings in basal body

b. Gram positive bacteria – Occurrence of mesosome and absence of outer membrane (outside of the cell wall)

129. Answer (3)

**Hint :** Nucleolus is membraneless structure and intermediate filaments are made up of acidic proteins.

**Sol. :** In centrosome, pair of centriole is called diplosome. Histone protein is packaging protein in eukaryotes.

130. Answer (4)

**Hint :** Endomembrane system includes ER, Golgi complex, lysosome and vacuoles.

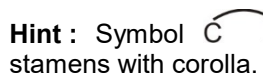
**Sol. :** Vacuoles are membrane bound space in cytoplasm but gas vacuole is membraneless, found in prokaryotes. It is not a part of endomembrane system.


131. Answer (2)

**Hint :** Homologous structures have same evolutionary origin but different function.

**Sol. :** Thorn in *Citrus* and tendril in cucumber are same in origin because both are modified stem but these are different in function. Rest are analogous structures which have different origin but same function.

132. Answer (2)

**Hint :** Symbol  represents adhesion of stamens with corolla.

**Sol. :**  represents adhesion of stamens with corolla known as epipetalous stamens.

133. Answer (2)

**Sol. :** Characterisation, identification, classification and nomenclature are the processes which are basic to taxonomy.

134. Answer (1)

**Hint :** Tyloses are tracheal plugs found in heart wood.

**Sol. :** Tyloses : Balloon shaped swelling of xylem parenchyma cells into lumen of vessels through pit

135. Answer (2)

**Hint :** Bulliform cells are found in upper epidermis of some grasses.

**Sol. :** In grasses (monocot) leaves are isobilateral and mesophyll is not differentiated into palisade and spongy parenchyma as in dicot leaves.

136. Answer (4)

**Hint :** Hormone which has an immunosuppressive effect.

**Sol. :** Cortisol is a fat soluble hormone which can cross the plasma membrane. Its receptors are present in cytoplasm. It lacks second messenger and it functions by acting on genes within the cells to synthesize proteins (enzymes) to regulate various physiological functions.

137. Answer (2)

**Hint :** This gland stores hormones in Herring's bodies.

**Sol. :** Hormones which act on the endocrine system but are synthesized within neurosecretory cells or neurons are called neurogenic hormones. Hypothalamus and adrenal medulla secrete neurogenic hormones but neurohypophysis only stores and releases neurogenic hormones. Thyroid gland stores its hormones in an inactive form but they are not neurogenic.

138. Answer (3)

**Hint :** Rods are responsible for vision in dim light/dark.

**Sol. :** Rods are responsible for vision in dim light (night) known as scotopic vision whereas cones are responsible for vision in bright light known as photopic vision.

139. Answer (1)

**Hint :** HMM contains binding site for ATP and actin.

**Sol. :** Attachment of ATP on head of myosin causes structural change in head to break the actin-myosin cross bridge. Hydrolysis of ATP occurs after detachment to activate head again.

140. Answer (3)

**Hint :** Main ion in extracellular fluid.

**Sol. :**  $\text{Na}^+$  ions are reabsorbed in PCT.  $\text{HCO}_3^-$  ions are reabsorbed in proximal part of PCT and secreted in minute quantity in distal part of PCT.  $\text{H}^+$ ,  $\text{NH}_4^+$  ( $\text{NH}_3$ ) and  $\text{K}^+$  are only secreted in PCT.

141. Answer (1)

**Hint :** Isovolumetric term is used for a heart chamber when it behaves as a closed isolated container.

**Sol. :** All four valves associated with both ventricles remains closed for a moment during isovolumetric ventricular systole as well as during isovolumetric ventricular diastole. During joint diastole, all valves of veins in auricle and auriculoventricular valves remains open but semilunar valves remain closed.

142. Answer (1)

**Hint :** Negative pressure is also known as suction pressure

**Sol. :** Negative intrapleural pressure pulls walls of lungs towards pleural space which prevents collapse of lungs. Positive intrapleural pressure may cause lungs to collapse as seen in pneumothorax. Negative intrapulmonary pressure causes inspiration and positive intrapulmonary pressure causes expiration.

143. Answer (4)

**Hint :** Process similar to detergent like action to decrease surface tension.

**Sol. :** Sodium taurocholate and sodium glycolate are bile salts responsible for emulsification of lipids. Due to emulsification, lipid molecules are broken down into small micelles which are absorbed by enterocytes by simple diffusion.

144. Answer (2)

**Hint :** These animals show bioluminescence.

**Sol. :** *Ascaris* has a complete digestive tract. *Pheretima* is hermaphrodite and *Rana* exhibits external fertilization in water. *Pleurobrachia* is marine with 8 ciliated comb plates as locomotory structures.

145. Answer (1)

**Hint :** These nephridia are enteronephric.

**Sol. :** Septal nephridia are typical nephridia in earthworm and pour their secretions into the intestine. So, they are enteronephric. Integumentary nephridia open on body surface and pharyngeal nephridia open into pharynx and buccal chamber.

146. Answer (2)

**Hint :** A compound containing ester bonds.

**Sol. :** On analysis of cellular components, lipids are obtained from the retentate along with biomacromolecules but lipids are not biomacromolecules because their molecular weight is less than 800 daltons. Proteins, starch and glycogen are polymers having molecular weight more than 1000 daltons, so they are considered as biomacromolecules.

147. Answer (1)

**Hint :** This epithelium is stratified.

**Sol. :** Transitional epithelium or urothelium is a specialized epithelium without basement membrane. So, it has stretchability and can bear tension. It is found in calyces, pelvis, ureters and urinary bladder. Male urethra is internally lined by

pseudostratified nonciliated columnar epithelium whereas female urethra is internally lined by stratified cuboidal epithelium.

148. Answer (2)

**Hint :** Antibody formed against any antigen is also formed during intrauterine life.

**Sol. :** IgM is responsible for primary immune response whereas IgG is responsible for secondary immune response.

149. Answer (3)

**Hint :** Precursor of Vit-A.

**Sol. :** Golden rice is a transgenic crop which is golden yellow in colour due to presence of  $\beta$ -carotene.  $\beta$ -carotene is converted into Vit-A within liver in presence of hormone thyroxine.

150. Answer (2)

**Hint :** Selection of recombinants.

**Sol. :** The foreign DNA can be introduced at one of the two antibiotic resistance genes. Thus, one antibiotic resistance gene helps in selecting the transformants while other antibiotic resistance gene gets inactivated due to insertion of foreign DNA and helps in selection of recombinants.

151. Answer (2)

**Hint :** Change in gene frequency by chance is genetic drift while ultimate source of variations is mutation.

**Sol. :**

- A. Mutation – source of new alleles
- B. Gene flow – change in allele frequency due to emigration and immigration.
- C. Natural selection – differences in survival and reproduction among various individuals.
- D. Genetic drift – Change in gene frequency by chance in small population.

152. Answer (2)

**Hint :** One pitch of dsDNA contains 10 base pairs.

**Sol. :**  $\therefore 1 \text{ nm} = 10 \text{ \AA}$

$\therefore 34 \text{ nm} = 34 \times 10 = 340 \text{ \AA}$

$\therefore 34 \text{ \AA ds DNA has } 10 \text{ bp}$

$\therefore \text{ Total number of bp in } 340 \text{ \AA DNA}$

$$= \frac{10 \times 340}{34} = 100 \text{ bp}$$

153. Answer (3)

**Hint :** Natural selection in which only one extreme phenotype is selected.

**Sol.** : Natural selection which favours only one extreme form of a trait is called directional selection. When intermediate phenotype is selected and extremes are rejected, it is called stabilizing selection. Disruptive selection is rare in which both extreme phenotypes are selected by nature.

154. Answer (3)

**Hint** : A fertile couple has the ability to conceive.

**Sol.** : Inability of male to copulate due to failure in erection of penis is called impotence. Permanent infertility either in male, in female or in both due to any cause is called sterility. Delivery of a dead child is known as still birth.

155. Answer (4)

**Hint** : Nucleocytoplasmic ratio increases after each successive cleavage.

**Sol.** : Cleavage is a special type of mitosis in which nucleocytoplasmic ratio increases due to decrease in amount of cytoplasm in each cell. So, cytoplasm nearly remains unchanged but genetic content increases as many folds as number of cells in morula stage.

156. Answer (4)

**Hint** : Identify an annelid.

**Sol.** : Earthworm is a hermaphrodite.

157. Answer (1)

**Hint** : Enzymes present in an acrosome inactivate arrest of ovum in metaphase-II.

**Sol.** : 2<sup>nd</sup> meiotic division is completed just after penetration of a sperm within ovum. As a result 2<sup>nd</sup> polar body is released and secondary oocyte is converted into ootid/egg cell which is followed by karyogamy.

158. Answer (3)

**Hint** : *Amoeba* is considered immortal.

**Sol.** : Life span of an organism is independent of its size. Unicellular organisms are considered as immortal.

159. Answer (4)

**Hint** : Release of 16 ova from both ovaries at a time.

**Sol.** : Each ovary is formed by group of 8 ovarioles. Both oviducts unite to form a common oviduct or vagina. Each ootheca contains 16 eggs arranged in two rows.

160. Answer (3)

**Hint** : This virus is causative agent of "avian influenza".

**Sol.** : H5N1 is a subtype of influenza, a virus causing 'Bird flu'. Pullorum is a bacterial disease caused by bacteria *Salmonella pullorum* and coccidiosis is a protozoan disease caused by *Eimeria*, swine flu is caused by H1N1 viruses.

161. Answer (2)

**Hint** : Presence of mammary glands is a unique property of all mammals.

**Sol.** : Presence of mammary glands and diaphragm is a unique property of all mammals. Ear pinna is absent in aquatic mammals. Four chambered heart is also found in birds and crocodiles. Pairs of lungs is present in all vertebrates except fishes. Closed circulation is present in all vertebrates.

162. Answer (2)

**Hint** : Sponges are monoecious.

**Sol.** : Choanocytes line spongocoel only in Ascon type of canal system. In Sycon type of canal system, they are found in excurrent canal and in leucon and rhagon type of canal system, choanocytes are present within flagellated chambers.

163. Answer (1)

**Hint** : This hormone is commonly known as hypercalcemic hormone.

**Sol.** : Hyposecretion of parathormone causes hypocalcemia which results in sustained contraction of a group of muscles known as tetany. Diabetes insipidus is caused due to deficiency of ADH and cretinism is caused due to deficiency of T<sub>4</sub> and T<sub>3</sub>. Gigantism is caused due to hypersecretion of growth hormone.

164. Answer (3)

**Hint** : All-or-non law.

**Sol.** : During action potential of a nerve fibre both depolarisation and repolarisation are included which occur due to influx of Na<sup>+</sup> ions and efflux of K<sup>+</sup> ions respectively. Rapid depolarisation and repolarisation is called spike potential which is equal to change in potential beyond firing level.

165. Answer (4)

**Hint** : Cranium is a part of this structure.

**Sol.** : Ball and socket joint present between humerus and pectoral girdle and between head of femur and pelvic girdle. Cartilaginous joints are present between adjacent vertebrae in vertebral column.

166. Answer (4)

**Hint :** Glomerular filtrate is converted into urine after reabsorption and secretion.

**Sol. :** Urine formation in kidney occurs by three processes :- Ultrafiltration through filtration slits, selective reabsorption and tubular secretion of various substances.

167. Answer (2)

**Hint :** Arteries originate from ventricles and act as distributing channels for blood.

**Sol. :** All arteries carry oxygenated blood except pulmonary and umbilical arteries which carry deoxygenated blood. Blood capillaries may be present in between two arterioles as well as in between two venules. Pulmonary vein does not possess valves.

168. Answer (3)

**Hint :** Centre which regulates respiratory rhythm centre.

**Sol. :** Pneumotaxic centre situated in pons is considered as a part of hind brain whereas hunger, thirst and thermoregulatory centre is situated in the hypothalamus which is a part of prosencephalon (forebrain).

169. Answer (3)

**Hint :** Swelling due to water retention.

**Sol. :** Marasmus is a disease in children below one year of age due to protein and energy malnutrition. Thin limbs, prominent ribs with dry, thin and wrinkled skin are characteristic features of Marasmus but pedal oedema is seen in Kwashiorkor.

170. Answer (4)

**Hint :** Occurs due to destruction of acetylcholine receptors.

**Sol. :** Muscular dystrophy is a genetic disorder leading to progressive degeneration of skeletal muscles. Osteoporosis is characterised by decreased bone mass and increased chances of fracture.

171. Answer (4)

**Hint :** Cord like structure which connects muscle to bone.

**Sol. :** Tendon is a dense regular connective tissue formed by collagen fibres and connects a muscle to a particular bone. Bones and cartilages are

specialized skeletal connective tissues, whereas blood is a specialized fluid connective tissue.

172. Answer (3)

**Hint :** Enzyme which catalyses proliferation of lymphocytes.

**Sol. :** ADA deficiency is caused due to deletion of gene responsible for synthesis of this enzyme. It is responsible for proliferation of lymphocytes, specially T- lymphocytes. Monoamine oxidase causes breakdown of catecholamines and favism is caused due to deficiency of enzyme glucose-6-phosphate dehydrogenase.

173. Answer (1)

**Hint :** Non-coding part of gene is absent in a plasmid.

**Sol. :** Introns are the noncoding part of genes which are not found in plasmids. Plasmids do not contain any vital gene. They are circular, without histone proteins and are always double stranded.

174. Answer (4)

**Hint :** A resinous mixture produced by honeybees.

**Sol. :** Fries are small fishes collected from nursery ponds which grow as fingerlings in rearing ponds. Enhancement of fish production is called 'Blue revolution'.

175. Answer (2)

**Hint :** These cells are connecting link between AMI and CMI.

**Sol. :** In AIDS patients, number of T-4 cells decreases due to their killing by cytotoxic T-cells. T-4 cells secrete interleukins which activate killer T-cells for CMI and B-lymphocytes for AMI.

176. Answer (1)

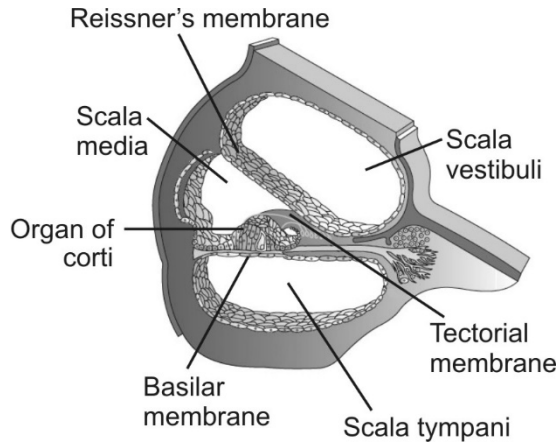
**Hint :** Scientist who used killed yeast to prove the theory of biogenesis.

**Sol. :** Louis Pasteur used killed yeasts in 'Swan necked flask' to disprove theory of spontaneous generation. S. L. Miller experimentally proved chemical evolution by using simulating experiment. A. I Oparin and J. B. S Haldane proposed the theory of chemical evolution for origin of life on earth.

177. Answer (4)

**Hint :** It separates cochlear duct from vestibular duct.

**Sol. :**



178. Answer (2)

**Hint :** It occurs in most developed countries.

**Sol. :** Demographic transition is a state in which population growth rate becomes zero. Couple protection is the process of bringing eligible

couples under family planning measures. Number of children produced by a couple to maintain zero population growth rate is called replacement level. Rate of natural increase is the difference between crude birth rate and crude death rate.

179. Answer (4)

**Hint :** Gametogenesis remains unaffected.

**Sol. :** After vasectomy, synthesis of sex hormones and spermatogenesis is not hampered because there is no effect on testes. However semen is without sperms.

180. Answer (3)

**Hint :** Animal commonly called the roundworm.

**Sol. :** In asexual reproduction, somatic cells divide mitotically to form new individuals and it is also known as somatogenic reproduction as the new organisms are formed from the somatic part of parental organism. *Hydra*, *Sycon* and *Planaria* can undergo asexual reproduction but not *Ascaris*.

