



Aakash

Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot-13, Sector-18, Udyog Vihar, Gurugram, Haryana-122018

MOCK TEST for NEET-2025

MM : 720

Test - 2

Time : 3 Hrs. 20 Mins.

Answers

1. (3)	41. (1)	81. (1)	121. (2)	161. (3)
2. (2)	42. (4)	82. (1)	122. (4)	162. (2)
3. (3)	43. (1)	83. (3)	123. (2)	163. (1)
4. (4)	44. (4)	84. (1)	124. (3)	164. (3)
5. (2)	45. (2)	85. (3)	125. (4)	165. (1)
6. (1)	46. (3)	86. (2)	126. (1)	166. (4)
7. (2)	47. (3)	87. (1)	127. (3)	167. (2)
8. (2)	48. (2)	88. (4)	128. (2)	168. (1)
9. (4)	49. (2)	89. (3)	129. (3)	169. (4)
10. (2)	50. (2)	90. (1)	130. (1)	170. (3)
11. (2)	51. (1)	91. (4)	131. (2)	171. (1)
12. (1)	52. (2)	92. (2)	132. (4)	172. (1)
13. (2)	53. (2)	93. (1)	133. (1)	173. (2)
14. (3)	54. (3)	94. (2)	134. (3)	174. (3)
15. (1)	55. (2)	95. (4)	135. (2)	175. (3)
16. (3)	56. (1)	96. (3)	136. (2)	176. (3)
17. (2)	57. (2)	97. (3)	137. (3)	177. (2)
18. (4)	58. (4)	98. (2)	138. (2)	178. (2)
19. (4)	59. (3)	99. (3)	139. (3)	179. (3)
20. (2)	60. (4)	100. (3)	140. (2)	180. (3)
21. (2)	61. (2)	101. (4)	141. (3)	181. (1)
22. (1)	62. (1)	102. (1)	142. (1)	182. (4)
23. (1)	63. (2)	103. (3)	143. (3)	183. (4)
24. (1)	64. (4)	104. (4)	144. (3)	184. (3)
25. (3)	65. (1)	105. (1)	145. (1)	185. (1)
26. (4)	66. (1)	106. (3)	146. (3)	186. (4)
27. (2)	67. (4)	107. (2)	147. (4)	187. (2)
28. (3)	68. (1)	108. (3)	148. (2)	188. (2)
29. (2)	69. (1)	109. (1)	149. (3)	189. (2)
30. (4)	70. (3)	110. (4)	150. (1)	190. (1)
31. (2)	71. (2)	111. (3)	151. (2)	191. (1)
32. (2)	72. (3)	112. (1)	152. (3)	192. (3)
33. (2)	73. (2)	113. (3)	153. (3)	193. (2)
34. (2)	74. (3)	114. (1)	154. (1)	194. (2)
35. (1)	75. (1)	115. (1)	155. (1)	195. (1)
36. (1)	76. (3)	116. (3)	156. (3)	196. (2)
37. (3)	77. (4)	117. (3)	157. (4)	197. (4)
38. (3)	78. (4)	118. (4)	158. (1)	198. (3)
39. (4)	79. (1)	119. (3)	159. (3)	199. (3)
40. (1)	80. (2)	120. (3)	160. (2)	200. (3)



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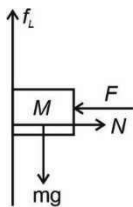
Answers & Solutions

PHYSICS

SECTION-A

- Answer (3)
Bohr's model is applicable for single electron species.
- Answer (2)
Equipotential surface always makes 90° with electric field.

- Answer (3)



$$f_L = mg$$

$$\mu N = mg$$

$$\mu F = mg$$

$$F = \frac{mg}{\mu} = \frac{5 \times 10}{0.5} = 100 \text{ N}$$

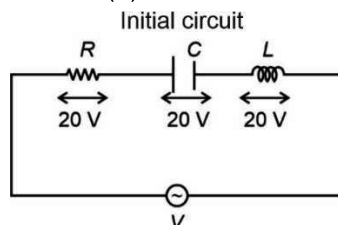
- Answer (4)

$$K + U = E$$

$$U = E - K$$

Since, kinetic energy cannot be negative hence, total energy cannot be less than potential energy.

- Answer (2)



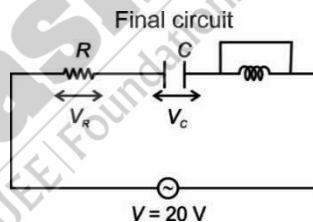
$$V^2 = V_R^2 + (V_L - V_C)^2$$

$$V^2 = (20)^2 + (20 - 20)^2$$

$$V = 20 \text{ V}$$

$$V_R = V_C = V_L$$

$$\therefore R = X_C = X_L$$



$$V^2 = V_R^2 + V_C^2$$

$$\therefore R = X_C$$

\Downarrow

$$V_R = V_C$$

$$V^2 = V_C^2 + V_C^2$$

$$(20)^2 = 2V_C^2$$

$$V_C = \frac{20}{\sqrt{2}} = 10\sqrt{2} \text{ V}$$

- Answer (1)

$$\frac{4}{3} \pi R^3 = 125 \times \frac{4}{3} \pi r^3$$

$$r = \frac{R}{5}$$

$$E = T \times 4\pi R^2$$

$$E_1 = T \times 125 \times 4\pi \left(\frac{R}{5}\right)^2$$

$$= 5 \times E$$

7. Answer (2)

$$v = \omega\sqrt{A^2 - x^2}$$

$$8 = \omega\sqrt{A^2 - (5)^2}$$

$$\Rightarrow \frac{64}{\omega^2} + 25 = A^2 \quad \dots(i)$$

$$10 = \omega\sqrt{A^2 - (4)^2}$$

$$\Rightarrow \frac{100}{\omega^2} + 16 = A^2 \quad \dots(ii)$$

From, (i) and (ii)

$$\frac{64}{\omega^2} + 25 = \frac{100}{\omega^2} + 16$$

$$\frac{36}{\omega^2} = 9$$

$$\omega^2 = \frac{36}{9}$$

$$\omega = 2 \text{ rad/s}$$

$$\therefore \omega = \frac{2\pi}{T} = 2$$

$$T = \pi = 3.14 \text{ s}$$

8. Answer (2)

$$C_1 = 2K \frac{C}{2} = KC$$

$$C_2 = 3K \frac{C}{2} = \frac{3}{2}KC$$

Now $C_{\text{eq}} = C_1 + C_2$ (parallel combination)

$$= KC + \frac{3KC}{2}$$

$$= \frac{5}{2}KC$$

9. Answer (4)

Electric field at axial point

$$\vec{E}_1 = \frac{2\vec{p}}{4\pi\epsilon_0 r^3}$$

Electric field at equatorial point

$$\vec{E}_2 = \frac{-\vec{p}}{4\pi\epsilon_0 r^3}$$

10. Answer (2)

$$T = 2\pi\sqrt{\frac{L}{g}} \Rightarrow T^2 = 4\pi^2 \frac{L}{g}$$

$$\therefore g = 4\pi^2 \frac{L}{T^2} \Rightarrow \frac{\Delta g}{g} = \frac{\Delta L}{L} + \frac{2\Delta T}{T} \quad \dots(i)$$

$$\therefore t = nT$$

$$\frac{\Delta T}{T} = \frac{\Delta t}{t} = \frac{1}{125}$$

$$\frac{\Delta L}{L} = \frac{0.1}{10}$$

From (i)

$$\frac{\Delta g}{g} \% = \left[\frac{0.1}{10} + 2 \times \frac{1}{125} \right] \times 100$$

$$\frac{\Delta g}{g} \% = \left[\frac{0.1}{10} + \frac{2}{125} \right] \times 100$$

$$= 1\% + 1.6\% = 2.6\%$$

11. Answer (2)

For $n_f = 2$, $n_i = 4$ transition, photon will be having least wavelength.

12. Answer (1)

$$\sin i_c = \frac{1}{\mu}$$

$$\sin 37^\circ = \frac{1}{\mu}$$

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

$$\tan i_p = \mu$$

$$i_p = \tan^{-1}\left(\frac{5}{3}\right)$$

13. Answer (2)

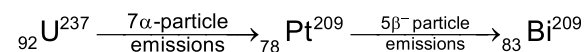
$$E = \frac{12400 \text{ eV}}{4000 \text{ \AA}} = 3.1 \text{ eV}$$

$$\phi_0 = E - K.E.$$

$$= (3.1 - 1.68) \text{ eV}$$

$$= 1.42 \text{ eV}$$

14. Answer (3)



15. Answer (1)

$$\frac{1}{f_i} = (\mu - 1) \left(\frac{2}{R} \right)$$

$$\frac{1}{20} = \frac{0.5 \times 2}{R}$$

$$R = 20 \text{ cm}$$

$$\frac{1}{f'} = (1.5 - 1) \left(\frac{1}{-20} - \frac{1}{20} \right)$$

$$\frac{1}{f'} = (0.5) \times \left(\frac{-2}{20} \right) = \frac{-1}{20}$$

$$\begin{aligned} \text{Power of arrangement (P)} &= \frac{1}{f} + \frac{1}{f'} + \frac{1}{f} \\ &= \frac{1}{20} + \left(\frac{-1}{20} \right) + \frac{1}{20} \\ &= \frac{1}{20} \end{aligned}$$

16. Answer (3)

$$T = 2\pi \sqrt{\frac{l}{g}}$$

$$T_1 = 2\pi \sqrt{\frac{l}{g - \frac{g}{2}}}$$

$$T_1 = 2\pi \sqrt{\frac{2l}{g}}$$

$$\frac{T}{T_1} = \frac{1}{\sqrt{2}}$$

$$T_1 = 2\sqrt{2} \text{ s}$$

17. Answer (2)

$$f_1 = \frac{1}{2l} \sqrt{\frac{T}{\mu}}$$

$$\frac{f_1}{f_2} = \sqrt{\frac{T_1}{T_2}}$$

$$\frac{400}{800} = \sqrt{\frac{80}{T_2}}$$

$$\frac{1}{4} = \frac{80}{T_2}$$

$$T_2 = 320 \text{ N}$$

$$T_2 = 32 \text{ kg-weight}$$

18. Answer (4)

$$3P_0 = P_0 + \rho gh$$

$$\rho gh = 2P_0$$

$$P_1 = \frac{\rho gh}{3} = \left(\frac{2P_0}{3} \right)$$

$$P_{\text{net}} = P_0 + \frac{2P_0}{3} = \frac{5P_0}{3}$$

19. Answer (4)

$$\vec{P}_i = mv \sin 60^\circ \hat{j} + mv \cos 60^\circ \hat{i}$$

$$= \frac{mv\sqrt{3}\hat{j}}{2} + \frac{mv\hat{i}}{2}$$

$$\vec{P}_f = -mv \sin 60^\circ \hat{j} + mv \cos 60^\circ \hat{i}$$

$$= -\frac{mv\sqrt{3}\hat{j}}{2} + \frac{mv\hat{i}}{2}$$

$$\Delta \vec{P} = \vec{P}_f - \vec{P}_i$$

$$\Delta \vec{P} = -mv\sqrt{3}\hat{j}$$

$$|\Delta \vec{P}| = mv\sqrt{3}$$

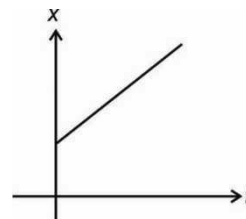
20. Answer (2)

After a long time, capacitor will be completely charged and will act as open wire while inductor will act as a resistance less wire.

$$i = \frac{10}{10} = 1 \text{ A} \quad \therefore P = i^2 R = 10 \text{ W}$$

21. Answer (2)

The given graph indicates that particle is moving with constant velocity and hence, zero acceleration



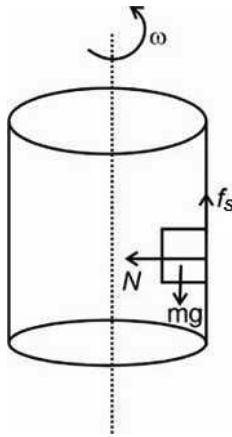
22. Answer (1)

For equilibrium:

$$f_s = mg \text{ and} \quad \dots(i)$$

$$N = ma = mr\omega^2$$

Minimum angular velocity will be needed when friction become maximum.



$$(f_s)_{\max} = \mu N = mg$$

$$\mu m r \omega^2 = mg \Rightarrow \mu = \frac{g}{r \omega^2}$$

$$\mu = \frac{10}{1.5 \times 10 \times 10} = \frac{1}{15}$$

23. Answer (1)

Dimensional formula of $\text{kg} \frac{\text{m}^2}{\text{s}^2}$ is

$$[ML^2 T^{-2}]$$

$$n_2 = n_1 \left[\frac{M_1}{M_2} \right]^1 \left[\frac{L_1}{L_2} \right]^2 \left[\frac{T_1}{T_2} \right]^{-2}$$

$$n_2 = 10 \left[\frac{1 \text{ kg}}{10 \text{ kg}} \right]^1 \left[\frac{1 \text{ m}}{100 \text{ m}} \right]^2 \left[\frac{1 \text{ s}}{10^3 \text{ s}} \right]^{-2}$$

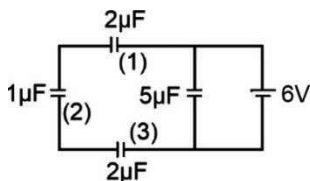
$$n_2 = 100$$

24. Answer (1)

Maximum loss of kinetic energy happens when the collision is perfectly inelastic.

25. Answer (3)

Capacitors (1), (2) and (3) are in series with the battery.



$$\therefore C_{\text{eq}} = \frac{1}{2} \mu\text{F}$$

$$Q = CV \Rightarrow Q = \frac{1}{2} \times 6$$

$$Q = 3\mu\text{C}$$

26. Answer (4)

$$\vec{\tau} = \vec{r} \times \vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -1 & 1 \\ 2 & 3 & 0 \end{vmatrix}$$

$$\vec{\tau} = \hat{i}(-3) - \hat{j}(-2) + \hat{k}(3+2)$$

$$\vec{\tau} = -3\hat{i} + 2\hat{j} + 5\hat{k}$$

27. Answer (2)

$$y = \overline{\overline{A+B}} = \overline{\overline{A}} \cdot \overline{\overline{B}} = A \cdot B$$

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	0

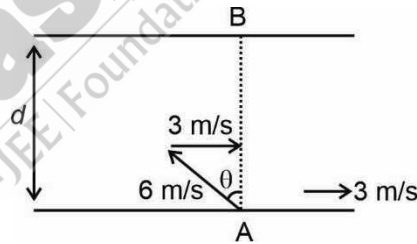
28. Answer (3)

The existence of threshold frequency in photoelectric effect can be explained by particle nature of light.

While $E = \frac{hc}{\lambda}$

$$\therefore E \propto \frac{1}{\lambda}$$

29. Answer (2)



For zero drift : $6 \sin \theta = 3 \Rightarrow \sin \theta = \frac{1}{2} \Rightarrow \theta = 30^\circ$

$$\therefore \text{Time to cross the river} = \frac{d}{6 \cos 30^\circ}$$

$$t = \frac{900\sqrt{3}}{6 \times \frac{\sqrt{3}}{2}} = 300 \text{ seconds}$$

30. Answer (4)

$$\text{Volumetric strain} = \frac{\text{change in volume}}{\text{original volume}}$$

Hence, volumetric strain has no unit.

31. Answer (2)

- Magnetic susceptibility of diamagnetic substance is negative
- Magnetic susceptibility of paramagnetic substance is small and positive.
- Magnetic susceptibility of ferromagnetic substance is large and positive.

32. Answer (2)

Given,

$$y = A \sin(\omega t) + B \sin(2\omega t)$$

$$\downarrow \qquad \qquad \downarrow$$

$$T_1 = \frac{2\pi}{\omega} = T_0 \quad T_2 = \frac{2\pi}{2\omega} = \frac{T_0}{2}$$

Clearly, the motion will repeat after T_0 time.

Hence, time period is $T_0 = \frac{2\pi}{20\pi} = \frac{1}{10}$ second

33. Answer (2)

In a series LCR ac circuit:

(a) Whether current will lead the voltage or not depends on the value of X_L and X_C

(b) Energy loss is maximum for $\cos\phi = 1$ but not zero.

34. Answer (2)

For thin prism:

$$\delta = (\mu - 1)A \Rightarrow \delta = 0.5 \times 4^\circ = 2^\circ$$

35. Answer (1)

Given $u = 0$; $a = 2 \text{ m/s}^2$

$$s = ut + \frac{1}{2}at^2 \Rightarrow s = 0 + \frac{1}{2} \times 2 \times 3^2 = 9 \text{ m}$$

Distance covered in n^{th} second:

$$S_{n^{\text{th}}} = u + \frac{a}{2}(2n - 1)$$

$$S_{3^{\text{rd}}} = 0 + \frac{2}{2}(2 \times 3 - 1) = 5 \text{ m}$$

$$\therefore \text{Ratio} = \frac{9}{5}$$

SECTION-B

36. Answer (1)

Instantaneous power:

$$P = \vec{F} \cdot \vec{v} = Fv \cos\theta$$

At highest point, θ will be 90°

$$\therefore P = Fv \cos 90^\circ = 0$$

37. Answer (3)

$q = ne$

$$F = \frac{1}{4\pi\epsilon_0} \frac{n^2 e^2}{d^2}$$

$$n^2 = \frac{4\pi\epsilon_0 F d^2}{e^2}$$

$$n = \sqrt{\frac{4\pi\epsilon_0 F d^2}{e^2}}$$

38. Answer (3)

By the circular dynamics at the highest point.

$$T_H + mg = \frac{mv^2}{r}$$

$$T_H + mg = \frac{m(\sqrt{3rg})^2}{r}$$

$$T_H = 2mg$$

$$\therefore T_L - T_H = 6mg$$

$$T_H \left[\frac{T_L}{T_H} - 1 \right] = 6mg$$

$$\frac{T_L}{T_H} - 1 = \frac{6mg}{T_H} = \frac{6mg}{2mg}$$

$$\frac{T_L}{T_H} = 1 + 3 = 4$$

39. Answer (4)

$$\frac{1}{R} = \frac{1}{3} + \frac{1}{16} + \frac{1}{8}$$

$$\frac{1}{R} = \frac{16 + 3 + 6}{48} = \frac{25}{48} \Rightarrow R = \frac{48}{25} \Omega$$

$$V_{PQ} = 1.5 \times \frac{48}{25} = \frac{14.4}{5} = 2.88 \text{ V}$$

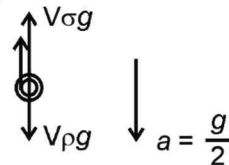
40. Answer (1)

$$r = \frac{mv}{qB} = \frac{\sqrt{2mK}}{qB} = \frac{\sqrt{2mqV}}{qB}$$

$$r \propto \sqrt{\frac{m}{q}}$$

41. Answer (1)

$$6\pi\eta r v = F_v$$



$$V\rho g - (F_v + V\sigma g) = ma$$

$$\Rightarrow \frac{4}{3}\pi r^3 \rho g - 6\pi\eta r v - \frac{4}{3}\pi r^3 \sigma g = \frac{4}{3}\pi r^3 \rho \left(\frac{g}{2}\right)$$

$$\Rightarrow 6\pi\eta r v = \frac{4}{3}\pi r^3 g (\rho - \sigma) - \frac{4}{3}\pi r^3 \rho g$$

$$\Rightarrow 6\pi\eta r v = \frac{4}{3}\pi r^3 g \left(\rho - \sigma - \frac{\rho}{2}\right)$$

$$\Rightarrow 6\pi\eta r v = \frac{4}{3}\pi r^3 g \left(\frac{\rho - 2\sigma}{2}\right)$$

$$\Rightarrow v = \frac{2\pi r^2 g (\rho - 2\sigma)}{18\eta\pi}$$

$$\Rightarrow v = \frac{r^2 g (\rho - 2\sigma)}{9\eta}$$

42. Answer (4)

Magnetic flux, $\phi = \vec{B} \cdot \vec{A} = BA \cos \theta$

$$\text{and } \varepsilon = \frac{-d\phi}{dt} \Rightarrow \varepsilon = -\frac{d}{dt}(BA \cos \theta)$$

Therefore, emf and current can be induced by varying B , A or θ .

43. Answer (1)

A rod of length L is bent to form a semi-circular ring of radius R .

$$\therefore \pi R = L \text{ or } R = \frac{L}{\pi}$$

Mass of semi-circular ring = mass of rod = M

$$\begin{aligned} \text{Moment of Inertia of ring about its diameter} \\ = \frac{2MR^2}{2} = MR^2 \end{aligned}$$

$$\text{Moment of inertia about } XY = \frac{1}{2}(MR^2)$$

$$= \frac{1}{2}M\left(\frac{L}{\pi}\right)^2 = \frac{ML^2}{2\pi^2}$$

44. Answer (4)

Gravitational field outside the sphere:

$$E = \frac{GM}{r^2}$$

$$\therefore E(r=5) = \frac{G \times 10}{5 \times 5} = \frac{-2G}{5}$$

Gravitational field inside the sphere :

$$E = \frac{-GMr}{R^3}$$

$$\therefore E(r=2) = \frac{-G \times 10 \times 2}{(4)^3} = \frac{-5G}{16}$$

Gravitational potential outside the sphere,

$$V = \frac{-GM}{r}$$

$$V(r=5) = -2G$$

Gravitational potential at centre of sphere,

$$V = \frac{-3GM}{2R} = \frac{-3G(10)}{2 \times 4}$$

$$V_0 = \frac{-15G}{4}$$

45. Answer (2)

At $t = 0$, maximum current will flow in the circuit and current will become zero eventually, when the capacitor is charged fully.

46. Answer (3)

For a cyclic process

$$Q = w$$

w = Area under P - V graph

$$\begin{aligned} w &= \frac{1}{2} \times (3-2) \times (2 \times 10^3 - 10^3) \\ &= \frac{1}{2} \times 1 \times 10^3 = 500 \text{ J} \end{aligned}$$

$$\therefore Q = 500 \text{ J}$$

47. Answer (3)

Springs with force constants $2K$ and $2K$ are in series, therefore their equivalent will become

$$\frac{2K \times 2K}{2K + 2K} = K$$

Then, the combination is in parallel with other spring of force constant K .

$$K_{eq} = K + K = 2K$$

$$\therefore T = 2\pi \sqrt{\frac{m}{K_{eq}}} = 2\pi \sqrt{\frac{m}{2K}}$$

48. Answer (2)

To apply electromagnetic force on a charged particle at rest, electric field must be present.

49. Answer (2)

Kirchhoff's junction law is based on conservation of charge.

50. Answer (2)

$$\varepsilon = \frac{-Ldi}{dt} \Rightarrow \varepsilon = -2 \times 3 = -6 \text{ V}$$

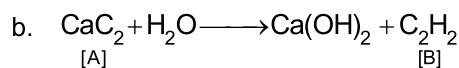
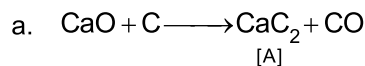
CHEMISTRY

SECTION-A

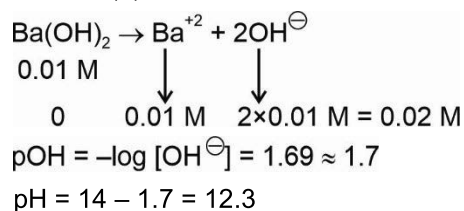
51. Answer (1)

If ΔG is negative, then the reaction is spontaneous and proceeds in the forward direction.

52. Answer (2)



53. Answer (2)



54. Answer (3)

$$\text{CFSE} = [-0.4x + 0.6y]\Delta_0$$

Where, x and y are number of electrons occupying t_{2g} and e_g orbitals respectively.

$$d^5 [\text{High spin}] = t_{2g}^3 e_g^2$$

$$\text{CFSE} = \{[-0.4 \times 3] + [0.6 \times 2]\} = 0$$

$$\text{Fe}^{2+} = 3d^6 4s^0$$

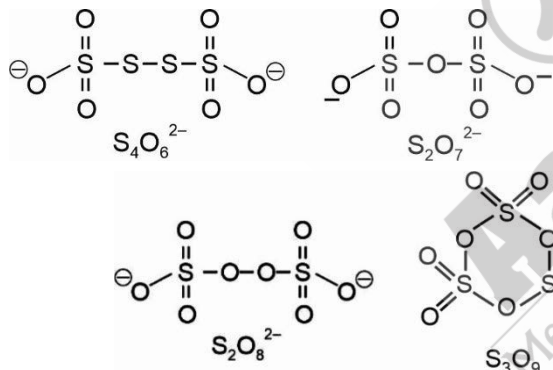
$$\text{For } 3d^6 \Rightarrow t_{2g}^6 4s^0$$

$[\text{Fe}(\text{CN})_6]^{4-}$ is a low spin complex

55. Answer (2)

In CO_2 , oxidation state of carbon is +4, which is maximum oxidation state of carbon. So, CO_2 cannot act as reducing agent.

56. Answer (1)



57. Answer (2)

Meq. of NH_3 = meq. of H_2SO_4 .

$$= 2 \times 1 \times 10 = 20 \text{ meq.}$$

mol. of NH_3 = mol. of 'N' atom = 20×10^{-3} mol

weight of 'N' atom = $20 \times 10^{-3} \times 14$ g

$$\% \text{ of 'N' atom} = \frac{20 \times 10^{-3} \times 14}{0.6} \times 100$$

$$= 46.67\%$$

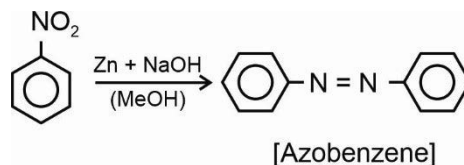
58. Answer (4)

In starch α -D-glucose units are held in which chain is formed by $\text{C}_1 - \text{C}_4$ glycosidic linkage whereas branching occurs by $\text{C}_1 - \text{C}_6$ glycosidic linkage.

59. Answer (3)

For spontaneous reactions $\Delta G < 0$ or $E_{\text{cell}} > 0$.

60. Answer (4)



61. Answer (2)

$$\omega = \frac{\text{MM} \times \text{It}}{nF}$$

$$= \frac{65.3 \times 2 \times 20 \times 60}{2 \times 96500}$$

$$= 0.812 \text{ g}$$

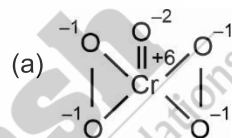
62. Answer (1)

$$\text{Molality} = \frac{X_{\text{solute}} \times 1000}{X_{\text{solvent}} \times M_{\text{solvent}}} = \frac{0.2 \times 1000}{0.8 \times 18} = 13.89$$

63. Answer (2)

Cr > Fe > Mn [Melting point].

64. Answer (4)



(b) $\text{VO}_3^- \rightarrow$ Oxidation state of V = + 5

(c) $\text{MnO}_4^- \rightarrow$ Oxidation state of Mn = + 7

(d) $\text{FeF}_6^{3-} \rightarrow$ Oxidation state of Fe = + 3

65. Answer (1)

Among all the elements of group 13, aluminium is most electropositive while gallium has the lowest melting point.

66. Answer (1)

• Use relation, $\Delta H = \Delta U + \Delta n_g RT$

$$\Delta n_g = 1 + 1 - 1 = 1 \text{ for the reaction}$$



67. Answer (4)

Salt containing anion of weak acid will give anionic hydrolysis

68. Answer (1)

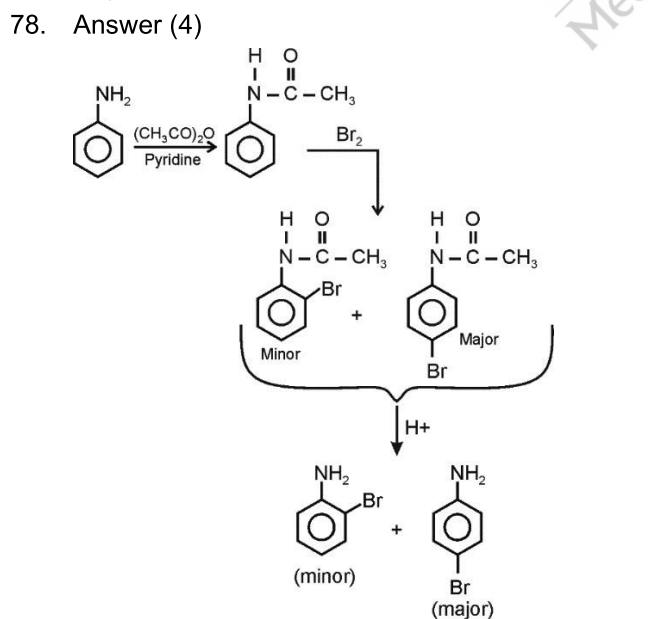
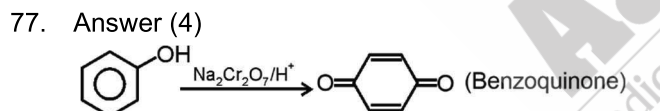
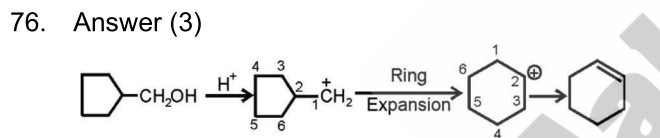
Acid-Base neutralization is a non-redox reaction.

69. Answer (1)

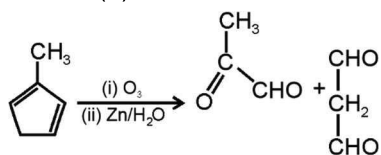
$(\text{BN})_x$ is a inorganic graphite.

$\text{B}_3\text{N}_3\text{H}_6$ is a inorganic Benzene.

70. Answer (3)
 $\text{HCl} < \text{HBr} < \text{HI}$ [Reducing power]
 $\text{HClO} < \text{HClO}_2 < \text{HClO}_3$ [Acidic strength]
 $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3$ [Basic strength]
71. Answer (2)
 $\text{H}_3\text{A} \rightleftharpoons 3\text{H}^+ + \text{A}^{3-}$
 $i = 1 + (4 - 1) \times 0.4 = 1 + 3 \times 0.4 = 1 + 1.2 = 2.2$
72. Answer (3)
 $\text{NaCl(aq)} \longrightarrow \text{Na}^+(\text{aq}) + \text{Cl}^-(\text{aq})$
 Cathode : $\text{H}_2\text{O} + \text{e}^- \longrightarrow \frac{1}{2} \text{H}_2(\text{g}) + \text{OH}^-(\text{aq})$
 Anode : $2\text{Cl}^-(\text{aq}) \longrightarrow \text{Cl}_2(\text{g}) + 2\text{e}^-$
73. Answer (2)
 $t_{1/2} = \frac{0.693}{k}$
74. Answer (3)
 Electron donating groups present at o/p position increases pK_a and decreases acidic character.
75. Answer (1)
 Heavier elements of group-14 do not form $\text{p}\pi - \text{p}\pi$ bond because their atomic orbitals are too large and diffuse to have effective overlapping.



79. Answer (1)
 $\text{Li} > \text{B} > \text{C} > \text{Be}$ (Order of IE_2)
80. Answer (2)
 Because of lower dissociation enthalpy, HCl is stronger acid than HF .
81. Answer (1)
 Bond length order: $\text{C} - \text{N} > \text{C} = \text{C} > \text{C} = \text{O} > \text{C} \equiv \text{N}$
 (pm) (143) (133) (121) (116)
82. Answer (1)
 $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$ (order of dipole moment)
83. Answer (3)



84. Answer (1)
 CO_2 , SiO_2 and GeO_2 are acidic in nature.
85. Answer (3)
 Phenolphthalein is used as an acid base indicator as it is colourless in acidic medium while pink in basic medium.

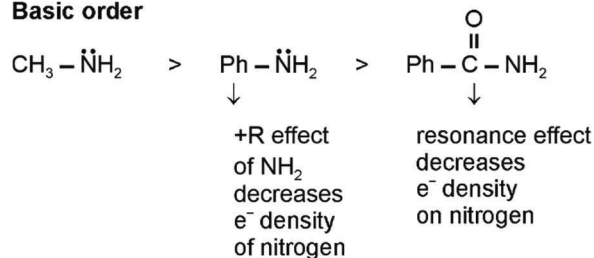
SECTION-B

86. Answer (2)
 $\text{C}_2\text{H}_5 - \text{O} - \text{C}_2\text{H}_5$, $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$
87. Answer (1)

88. Answer (4)
 Ethanol and α -methylketones give iodoform test.
89. Answer (3)

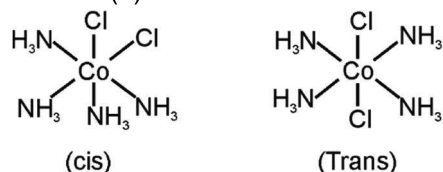
Orbital	n	l	m_l (possible values)
4d	4	2	-2, -1, 0, +1, +2
4p	4	1	-1, 0, +1
4s	4	0	0
4f	4	3	-3, -2, -1, 0, +1, +2, +3

90. Answer (1)
Basic order

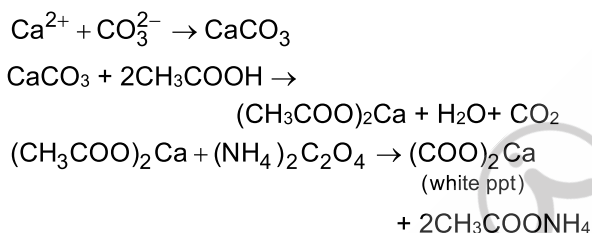


91. Answer (4)
Number of degenerate orbitals in second excited state of $\text{He}^+ = n^2 = 3^2 = 9$.

92. Answer (2)



93. Answer (1)



Ca^{2+} gives brick red colour to flame

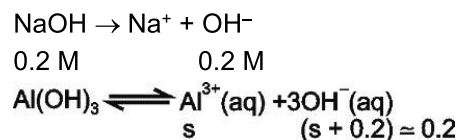
94. Answer (2)

Mole fraction of solvent = 0.9 mol H_2O
Mass of solvent = $0.9 \times 18 = 16.2$ g

95. Answer (4)

$$r_n = 0.529 \left(\frac{n^2}{Z} \right) \text{Å} = 0.529 \left(\frac{4^2}{2} \right) \text{Å} = 0.529 \times 8 \text{Å}$$

96. Answer (3)



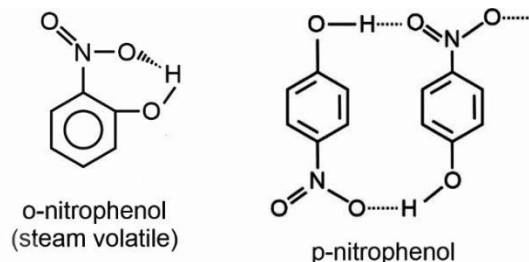
$$K_{sp} = [\text{Al}^{3+}][\text{OH}^-]^3$$

$$4 \times 10^{-34} = [\text{Al}^{3+}][0.2]^3$$

$$[\text{Al}^{3+}] = \frac{4 \times 10^{-34}}{(0.2)^3} = 5 \times 10^{-32}$$

97. Answer (3)

p-nitrophenol has higher boiling point than that of o-nitrophenol due to extensive intermolecular hydrogen bonding while o-nitrophenol has intramolecular hydrogen bonding and it is steam volatile.



98. Answer (2)

Electron withdrawing group makes aryl halides more susceptible to nucleophilic substitution.

99. Answer (3)

LiAlH_4 will reduce – ketones, carboxylic acid and $-\text{NO}_2$ group.

100. Answer (3)

Sodium acetate will undergo hydrolysis

$$\text{pH} = 7 + \frac{1}{2}[\text{p}K_a + \log C]$$

$$= 7 + \frac{1}{2}[4.75 + \log 0.2]$$

$$= 7 + \frac{1}{2}[4.75 - 0.7]$$

$$= 9.025$$

pH \approx 9

BOTANY

SECTION-A

101. Answer(4)

Metabolic reactions occur in living being and some of them can be made to occur in cell-free systems.

102. Answer (1)

During unfavourable conditions, plasmodium differentiates in sporangia and forms fruiting bodies bearing spores at their tips.

- 103 Answer (3)

Artificial system of classification separated the closely related species. Numbers and codes are assigned to all the observable characters in numerical taxonomy.

104. Answer (4)

Each ovule has one or two protective envelopes called integuments.

128. Answer (2)

Species composition is the structural aspect of an ecosystem.

129. Answer (3)

According to Rivet popper hypothesis, rivets on the wings are considered as keystone species.

130. Answer (1)

The flowers that are pollinated by seed with both genes recessive is $r_1r_2 = \frac{1}{16} \times 400 = 25$ seeds.

131. Answer (2)

The progenies of test cross can be easily analysed to predict the genotype of test organism.

132. Answer (4)

The flowers that are pollinated by flies and beetles secrete foul odour to attract pollinators.

133. Answer (1)

Phloem parenchyma is absent in the most monocotyledons.

134. Answer (3)

Meiotic products are haploid (C) *i.e.* 10 pg DNA. Parent cell (meiocyte) has 2C amount of DNA.

Parent cell at G₂ stage has 4C amount of DNA *i.e.*, 40 pg DNA.

135. Answer (2)

In metaphase, condensation of chromosomes is completed and their morphology is most easily studied.

SECTION – B

136. Answer (2)

Conidia are asexual spores that is common to both ascomycetes and deuteromycetes.

137. Answer (3)

Gracilaria belongs to Rhodophyceae while *Ectocarpus*, *Dictyota* and *Laminaria* are brown algae.

138. Answer (2)

The stamens united into one bundle, monoadelphous as in china rose.

Pea and *Sesbania* shows diadelphous stamen.

139. Answer (3)

In dicot roots, xylem and phloem within a vascular bundle are arranged in an alternate manner along the different radii, the arrangement is called radial.

140. Answer (2)

Check point present at metaphase-anaphase transition is influenced by chromosome attachment to spindle.

141. Answer (3)

During activation phase of glycolysis, two molecules of ATP are used.

142. Answer (1)

Centrioles show 9 + 0 arrangement of microtubules giving a cartwheel like appearance.

143. Answer (3)

VNTRs are minisatellites.

144. Answer (3)

During transcription, the dsDNA helix is unwound by the enzyme RNA polymerase.

145. Answer (1)

Whisky, brandy and rum are produced by distillation.

146. Answer (3)

Balanus dominates the intertidal area and excludes the smaller barnacle *Chathamalus* from that zone. They show competition.

Rest are examples of commensalism.

147. Answer (4)

Pyramid of energy is always upright. In grassland ecosystem, pyramids of number and biomass are also upright.

148. Answer (2)

Since the parents are unaffected but their both daughter and son are affected, the trait would be autosomal recessive.

149. Answer (3)

Zoological parks are *ex-situ* conservation strategies of biodiversity.

150. Answer (1)

Gibberellic acids are the phytohormones that are derived from terpenes.

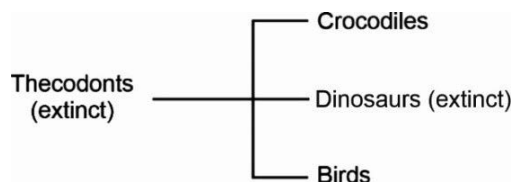
ZOOLOGY

SECTION-A

151. Answer (2)

The construction of the 1st rDNA emerged from the possibility of linking a gene encoding antibiotic resistance with a native plasmid of *Salmonella typhimurium*.

152. Answer (3)



153. Answer (3)

Periplaneta absorbs nitrogenous waste products and convert them into uric acid which is excreted out through the hindgut.

154. Answer (1)

Members of the class Osteichthyes are mostly oviparous and development is direct.

155. Answer (1)

Struthio, *Apteryx* and *Aptenodytes* are flightless birds.

156. Answer (3)

Ligases catalyse the linking together of two molecules. They belong to class VI of enzymes.

157. Answer (4)

Haemophilia is a genetic disorder and can be detected by the technique known as amniocentesis.

158. Answer (1)

In the dense regular connective tissue, the collagen fibres are present in rows between many parallel bundles of fibres. Tendons and ligaments are the examples of this type of tissue.

159. Answer (3)

Cerebral hemispheres, optic lobes and olfactory lobes are paired structures in frogs.

160. Answer (2)

During aestivation and hibernation in frogs, the gaseous exchange takes place through skin. Respiration through skin is known as cutaneous respiration.

161. Answer (3)

Hydra belongs to the phylum Cnidaria.

Ctenoplana and *Pleurobrachia* belong to the phylum Ctenophora.

Ophiura belongs to the phylum Echinodermata.

162. Answer (2)

Morphine is an alkaloid.

163. Answer (1)

In the cardiac cycle of humans, to begin with, all the four chambers of heart are in a relaxed state, i.e., they are in joint diastole. As the tricuspid and bicuspid valves are open, blood from the pulmonary veins and vena cava flows into the left and the right ventricle respectively through the left and right atria. The semilunar valves are closed at this stage. The SAN now generates an action potential which stimulates both the atria to undergo a simultaneous contraction – the atrial systole.

164. Answer (3)

- | | |
|---------------------|-------------------------------|
| (1) Eosinophils | – Resist infections |
| (2) RBC | – Life span is of 120 days |
| (3) Platelets | – Thrombocytes |
| (4) 'A' blood group | – Antigen 'A' on RBCs surface |

165. Answer (1)

Tetraiodothyronine and steroid hormones regulate the gene expression or chromosome function by the interaction of hormone – receptor complex with the genome.

166. Answer (4)

The flower tops, leaves and the resin of *Cannabis* plant are used in various combinations to produce marijuana, hashish, charas and ganja.

167. Answer (2)

Vasopressin/ADH is released from neurohypophysis or pars nervosa, but it is actually synthesised by the hypothalamus.

168. Answer (1)

The ascending limb of loop of Henle is impermeable to H₂O while descending limb of Henle's loop is almost impermeable to electrolytes.

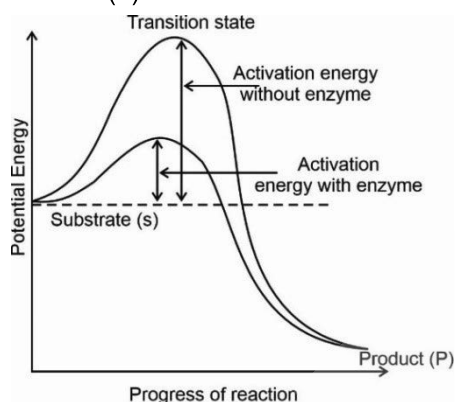
169. Answer (4)

The myelinated nerve fibres are enveloped with Schwann cells, which form a myelin sheath around the axon. The gaps between two adjacent myelin sheaths are called nodes of Ranvier. Myelinated nerve fibres are found in spinal and cranial nerves. Unmyelinated nerve fibre is enclosed by a Schwann cell that does not form a myelin sheath around the axon and is commonly found in ANS and somatic neural systems.

170. Answer (3)

In humans, the part of hindbrain which is connected to the spinal cord is medulla oblongata. The medulla contains centres which control respiration, cardiovascular reflexes and gastric secretions.

171. Answer (1)



Enzymes lower the activation energy as required for a particular reaction.

172. Answer (1)

The menstrual phase is followed by the follicular phase. During this phase, the primary follicles in the ovary grow to become fully mature Graafian follicle.

173. Answer (2)

The male reproductive accessory glands include paired seminal vesicles, a prostate and paired bulbourethral glands. Secretions of these glands constitute the seminal plasma which is rich in fructose, calcium and certain enzymes.

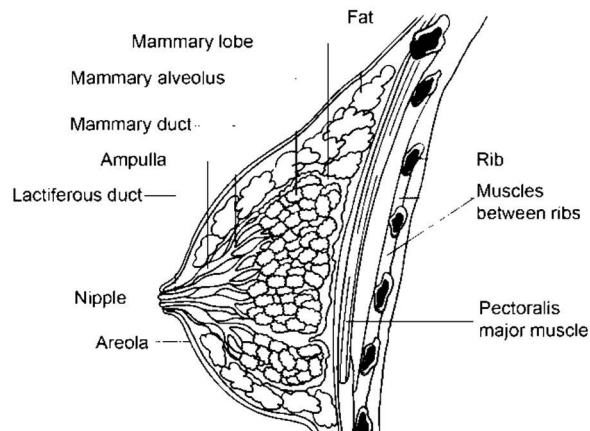
174. Answer (3)

Malonate is the competitive inhibitor of succinate.

175. Answer (3)

The two enzymes isolated from *E.coli* were responsible for restricting the growth of bacteriophages, where one added methyl groups to the bacterial DNA and the other cut the viral DNA at specific sites.

176. Answer (3)



177. Answer (2)

Pneumonia is a bacterial disease and bronchitis can be caused due to air pollutants.

178. Answer (2)

Salivary glands, mammary glands and sweat glands are the examples of multicellular glands.

179. Answer (3)

Hippocampus belongs to the class Osteichthyes. It has a 2-chambered heart.

Rana (Frog) is an amphibian having a 3-chambered heart.

Pavo is a bird and it has a 4-chambered heart. *Crocodilus* is a reptile and it has a 4-chambered heart.

180. Answer (3)

Nereis and *Pheretima* are annelids and possess closed circulatory system.

181. Answer (1)

Transmission of HIV cannot be caused by hugging, sharing food and using public toilets.

182. Answer (4)

High pH leads to association of oxygen and haemoglobin.

183. Answer (4)

A bioreactor does not contain any gene regulation system.

184. Answer (3)

Insulin cannot be orally administered to diabetic patients because it will degrade in the alimentary canal as insulin is proteinaceous in nature.

185. Answer (1)

Australopithecines probably lived in East African grasslands. Evidence shows that they hunted with stone weapons but essentially ate fruits.

SECTION - B

186. Answer (4)
The thymus gland is a lobular structure located between lungs behind sternum on the ventral side of aorta.
187. Answer (2)
The structures in different organisms which are not similar anatomically but they perform similar functions are called analogous organs, such as flippers of penguins and dolphins.
188. Answer (2)
Frequency of homozygous recessive genotype (q^2) = 0.09 (given)
 $q = \sqrt{0.09} = 0.3$
According to Hardy-Weinberg equilibrium, $p + q = 1$
 $p = 1 - q \Rightarrow 1 - 0.3 \Rightarrow 0.7$
Frequency of homozygous dominant genotype = p^2
= $(0.7)^2 = 0.49$
Percentage of individuals homozygous for dominant allele = 49%
189. Answer (2)
Nearly 45 to 50 million or 0.045 to 0.050 billion MTPs are performed in a year all over the world.
MTP is considered relatively safe during the first trimester, *i.e.*, upto 12 weeks of pregnancy.
Body of foetus covered with fine hair, eye-lids separate and eyelashes are formed by the end of the second trimester (24 weeks of pregnancy).
190. Answer (1)
Cranial bones – Frontal, Ethmoid, Temporal
Facial bones – Maxilla, Zygomatic, Lacrimal
191. Answer (1)
In cockroaches, the brain is represented by supraoesophageal ganglion which supplies nerves to antennae and compound eyes.
192. Answer (3)
The smaller the DNA fragment size, the farther it moves away from cathode. The separated DNA fragments can be visualised only after staining the DNA with ethidium bromide, followed by exposure to UV radiation.
193. Answer (2)
On treatment with CaCl_2 or with specific concentration of a divalent cation, the efficiency with which DNA enters the bacterium through pores in its cell wall increases.
194. Answer (2)
Diploid – Primary spermatocyte, spermatogonium, oogonia, primary oocyte
Haploid – Secondary spermatocyte, secondary oocyte, ovum, spermatid, spermatozoan
195. Answer (1)
Lack of relaxation between successive stimuli in sustained muscle contraction is known as tetanus.
196. Answer (2)
Each coxal bone is formed by the fusion of three bones – ilium, ischium and pubis. At the point of fusion of the above three bones, is a cavity called acetabulum to which the thigh bone articulates.
197. Answer (4)
The 'Reproductive and Child Health Care programmes' promote birth control methods.
198. Answer (3)
The RNA can be removed by the treatment with ribonuclease whereas proteins can be removed by the treatment with protease. To isolate DNA, we will not use DNase.
199. Answer (3)
Accumulation of urea in blood is called uremia.
200. Answer (3)
In ECG, the P-wave represents the electrical excitation of the atria. The QRS complex represents the depolarisation of the ventricles.
The end of the T-wave marks the end of ventricular systole.

