ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

CLASSROOM CONTACT PROGRAMME

(Academic Session : 2024 - 2025)

ENTHUSIAST COURSE

PHASE : MEA,B,C,D,F,G,H,L,M,N,O,P,Q,R,S,U & V

TARGET : PRE-MEDICAL 2025

Test Type : **MAJOR** Test Pattern : **NEET (UG)**

TEST DATE : 15-01-2025

ANSWER KEY

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

HINT – SHEET

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84. Ans (2)

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91. Ans (3)

$$I_1 = \left[\frac{ML^2}{3}\sin^2 30^\circ\right] \times 2$$

$$\boxed{I_1 = \frac{ML^2}{6}}$$

$$\boxed{I_2 = I_3 = \frac{ML^2}{3}}$$

$$I_4 = \left[\frac{ML^2}{3}\right] \times 3$$

$$\therefore \boxed{I_4 = ML^2}$$

$$I_5 = \left[\frac{ML^2}{3}\sin^2 30^\circ\right] + M(L\sin 30^\circ)^2$$

$$I_5 = \frac{ML^2}{12} + \frac{ML^2}{4}$$

$$= \frac{ML^2 + 3ML^2}{12}$$

$$\boxed{I_5 = \frac{ML^2}{3} = I_2 = I_3}$$

92. Ans (1)

System is in rotational equilibrium

$\therefore |\vec{\tau}_{net}| = 0$

$\therefore F_1 r_1 - F_2 r_2 = 0$

$\therefore F_1 r_1 = F_2 r_2$

93. Ans (3)

If net force on a system is zero, then calculation of torque is independent upon the choice of point about which it is to be calculated.

94. Ans (3)

$$E_q = \frac{E_1 r_2 + E_2 r_1}{r_1 + r_2} = E_1 \frac{\left[r_2 + \left(\frac{E_2}{E_1}\right) r_1\right]}{(r_2 + r_1)}$$

$$\text{or } E_2 \left[\frac{r_1 + \left(\frac{E_1}{E_2}\right) r_2}{r_1 + r_2}\right]$$

Hence E_{eq} may be equal to greater or less than E_1 or E_2 depending as above on r_1 and r_2.

And $r_{eq.} = \frac{r_1 r_2}{r_1 + r_2} = r_1 \left(\frac{r_2}{r_1 + r_2}\right)$

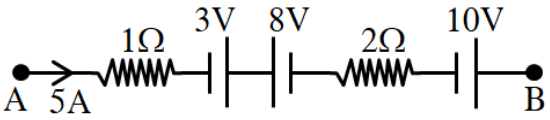
$$\text{or } r_2 \left(\frac{r_1}{r_1 + r_2}\right) < r_1 \text{ and } r_2.$$

95. Ans (2)

$$S = \frac{G}{\frac{I}{I_g} - 1} \Rightarrow 4 = \frac{36}{\frac{I}{I_g} - 1} \Rightarrow \frac{I}{I_g} = \frac{10}{1}$$

$$\Rightarrow \frac{I_g}{I} = 0.1 \quad \Rightarrow \frac{I_g}{I} \times 100 = 10\% .$$

96. Ans (2)



Using KVL,

$V_A - 5(1) + 3 - 8 - 5(2) + 10 = V_B$

$V_A - 10 = V_B$

$V_A - V_B = 10V$.

97. Ans (2)

$R^3 = 8r^3$

$R = 2r = 2 \times 10^{-3}$ m

$$V = \frac{kq}{R} = \frac{9 \times 10^9 \times 8 \times 10^{-9}}{2 \times 10^{-3}}$$

$= 3.6 \times 10^4$ V

98. Ans (4)

The total electric charge of a system is the algebraic sum of all the individual charges in the system, also known as law of superposition of electric charge.

99. Ans (3)

$y = \frac{\Delta x D}{d} \Rightarrow \frac{\beta}{3} = \frac{\Delta x D}{d} \Rightarrow \frac{\lambda D}{3d} = \frac{\Delta x D}{d}$

$\Delta x = \frac{\lambda}{3}$

$\therefore \Delta\phi = \frac{2\pi}{\lambda}\Delta x$

$\Delta\phi = 2\pi/3$

$I_R = I_0\cos^2\left(\frac{\Delta\phi}{2}\right) = I_0\cos^2(\pi/3)$

$\therefore I_R = \frac{I_0}{4}$

100. Ans (3)

$\omega_1 = 2\omega_2$

$\frac{\omega_1}{\omega_2} = \frac{2}{1} = \frac{a_1}{a_2}$ ....(ω α a) (Given)

$\frac{I_{min}}{I_{max}} = \frac{(a_{min})^2}{(a_{max})^2} = \left(\frac{a_1 - a_2}{a_1 + a_2}\right)$

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

$= 1 : 9$

101. Ans (2)

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

$\frac{9g}{25} = \frac{g}{\left(1 + \frac{h}{R}\right)^2}$

$\frac{h}{R} + 1 = \frac{5}{3}$

$h = \frac{2R}{3}$.

102. Ans (2)

$V_0 = \sqrt{\frac{GM}{R}}$

$\frac{(V_0)_A}{(V_0)_B} = \sqrt{\frac{R_B}{R_A}}$

$\frac{4V}{V_B} = \sqrt{\frac{4R}{16R}} = \frac{1}{2}$

$V_B = 8V$

103. Ans (4)

Energy stored by a capacitor $U = \frac{q^2}{2C}$

$U_1 = \frac{q_1^2}{2C}$, $U_2 = \frac{q_2^2}{2C}$

$\frac{U_1}{U_2} = \left(\frac{q_1}{q_2}\right)^2 = \left(\frac{q}{q+2}\right)^2$

given $\frac{u_2 - u_1}{u_1} = 0.21$

On solving $q = 20$ C

104. Ans (2)

Workdone = Area under (Fx curve)

$= 10 \times 1 + 20 \times 1 - 20 \times 1 + 10 \times 1$

$= 20$ erg

105. Ans (1)

$x = \frac{mL}{M_{cart} + m} = \frac{60 \times 3}{120 + 60} = 1m$ left side

106. Ans (3)

In metals and semimetals the fermi level lies inside at least one band i.e., inside conduction band. So (S)-4.

107. Ans (3)

Case–I :

$V_A < V_B$ [$\because (-10V) < (-5V)$]

D_1 & D_3 are RB and D_2 is FB

$\therefore R_1 = \frac{R}{4} + R + \frac{R}{4} = \frac{3R}{2}$

Case–II :

$V_A > V_B$

$\Rightarrow$ D_1 & D_2 are FB and D_3 is R_B

$\therefore R_2 = \frac{R}{4} + \frac{\frac{R}{2} \times \frac{R}{2}}{\left(\frac{R}{2} + \frac{R}{2}\right)} + \frac{R}{4} = \frac{3R}{4}$

Case–III :

$V_A > V_B$

$\Rightarrow$ same as case–II

$R_3 = \frac{3R}{4}$

108. Ans (4)

Impulse $I = |\Delta\vec{p}|$ = (same)

$F_{avg} = \frac{|\Delta\vec{p}|}{\Delta t} \Rightarrow F_{avg} \propto \frac{1}{\Delta t}$

$\because \Delta t_A < \Delta t_B$

$\therefore F_A > F_B$

109. Ans (4)

As $T = \frac{2u_y}{g}$

also T = same $\Rightarrow (u_y)_A = (u_y)_B$

$U_A \cos 45° = U_B \cos 60°$

$\frac{u_A}{u_B} = \frac{1}{\sqrt{2}}$

110. Ans (1)

For first interval : acceleration is +ve and constant

For second interval : acceleration is −ve and constant.

111. Ans (3)

Venturiflow meter is used to measure flow rate.

112. Ans (2)

$\frac{F_C}{F_C'} = \frac{mv^2}{r} \times \frac{2r}{mv^2}$

$\therefore \frac{F_C}{F'_C} = \frac{2}{1}$

$\therefore F_C' = \frac{F_C}{2}$ (it becomes halved)

113. Ans (1)

$\hat{E} \times \hat{B} = \hat{v}$

$+\hat{k} \times \hat{B} = -\hat{j}$

$\hat{B} = -\hat{i}$

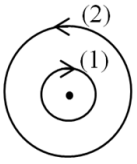
114. Ans (3)

$V = \sqrt{V_R^2 + V_L^2}$

$\sqrt{(10)^2 + (10)^2}$

$= 10\sqrt{2}$ volt

115. Ans (2)



$B_{net} = B_1 - B_2$

$B_1 = \frac{\mu_0 iN}{2r_1} = \frac{\mu_0 \times 0.2 \times 10}{2 \times 0.2} = \frac{\mu_0 \times 10}{2} \Rightarrow 5\mu_0$

$B_2 = \frac{\mu_0 (0.3) \times 10}{2 \times 0.4} = \frac{3\mu_0 \times 10}{8} = \frac{15\mu_0}{4}$

$B_{net} = \frac{5}{4}\mu_0$

116. Ans (1)

$B_{axis} = \frac{\mu_0}{4\pi} \cdot \frac{2M}{r^3}$

117. Ans (2)

Meissner effect

118. Ans (2)

W_{ABCA} = (Area of ΔABC)

$= -\frac{1}{2} \times (500 - 100) \times (200 - 100) \times 10^3 \times 10^{-6}$

$= -20$ J

119. Ans (2)

FLOT

$Q = \Delta U + W$

$\Delta U = Q - W$

$= 20 \times 4.2$ kJ $- 4$ kJ

$= 84 - 4$

$= 80$ kJ

120. Ans (3)

$P \propto T^4$

PT^{-4} = cont.

For adiabatic process

$PT^{\frac{\gamma}{1-\gamma}}$ = const.

By compering $\frac{\gamma}{1-\gamma} = -4$

$\Rightarrow \therefore \gamma = 4/3$

121. Ans (1)

0°C to 4°C density of water increases and maximum at 4°C then decreases due to anomalus behaviour of water.

122. Ans (2)

$\frac{\Delta T}{\Delta t} = K\left[\frac{T_1 + T_2}{2} - T_S\right]$ Newton's law of cooling

$\frac{64 - 52}{10} = K\left[\frac{64 + 52}{2} - 16\right]$.....(i)

$\frac{52 - T}{10} = K\left[\frac{52 + T}{2} - 16\right]$ .....(ii)

on solving (i) & (ii) T = 43°C

123. Ans (2)

$n = A\sin(\omega t) = A\sin(\theta_1)$

$v = \omega A\cos(\omega t) = \omega a \sin\left(\omega t + \frac{\pi}{2}\right) = A\sin(\theta_2)$

$a = -\omega^2 A \sin(\omega t) = \omega^2 A \sin(\omega t + \pi) = A\sin(\theta_3)$

Thus $\theta_3 > \theta_2 > \theta_1$

and $\theta_3 - \theta_2 = +\pi/2$

$\theta_2 - \theta_1 = +\pi/2$

124. Ans (1)

$\lambda = 2(\lambda_2 - \lambda_1)$

$\lambda = 2(58 - 18)$ cm

$\lambda = 80$ cm

$v = \lambda f$

$= \frac{80}{100} \times 500 = 400$ m/s

126. Ans (4)

$\frac{1}{f} \propto \mu \propto \frac{1}{\lambda}$

$f \propto \lambda$

127. Ans (4)

$P = P_1 + P_2$

$= 2 - 1 = +1D$

$\therefore\ f = \frac{100}{P} = \frac{100}{1} = 100$cm

128. Ans (3)

$F = [MLT^{-2}]$

$a = 1, b = 1, c = -2$

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

$x = 1, y = 2, z = -2$

$ax + by + cz = 1 + 2 + 4 = 7$

129. Ans (3)

The least count of given Vernier Calipers is

LC = MSD − VSD = 1 - (9/10) = 0.1 mm

Zero Error = CVSD × LC

$= 3 \times 0.1 = 0.3$ mm

130. Ans (4)

$R = 75 \times 10^2 \pm 5\%$ of 7500

$R = (7500 \pm 375)\Omega$

131. Ans (1)

In metre bridge length of wire should be constant

So, low temperature coefficient is required.

Also, $R = \frac{\rho \ell}{A}$

$\therefore R \propto \rho$

For Higher value of resistance, for a small displacement along wire, we are getting more deflection.

$\therefore$ For high resistivity, our device is much more sensible.

132. Ans (4)

Value of reaction

$12 \times 7.68 - 13 \times 7.48 = 92.16 - 97.24 = -5.08$

$\therefore$ Required energy = 5 MeV

133. Ans (3)

de-Broglie wavelength of gas molecules

$\lambda = \frac{h}{\sqrt{2mE}} = \frac{h}{\sqrt{3mkT}}$

$\Rightarrow \frac{\lambda_H}{\lambda_{He}} = \sqrt{\frac{m_{He}T_{He}}{m_H T_H}} = \sqrt{\frac{4(273+127)}{2(273+27)}} = \sqrt{\frac{8}{3}}$

134. Ans (3)

$_{90}X^{200} \longrightarrow {}_{80}Y^{168} + a \times {}_2\alpha^4 + b \times {}_1\beta^0$

135. Ans (1)

$\tau = PE\sin\theta$

$\tau = 4 \times 10^{-9} \times 5 \times 10^4 \times \frac{1}{2}$

$= 10^{-4}$ N.m

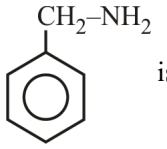
142. Ans (1)

as per EN

$HF > H_2O > NH_3$

(H Bond strength)

153. Ans (1)

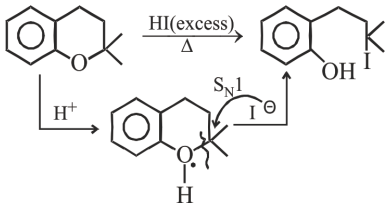
Duo to localized lone pair  is the strongest base

157. Ans (4)

$CH_3—CH_2—Cl \xrightarrow{AgCN} CH_3—CH_2—NC$

$CH_3—CH_2—Cl \xrightarrow{KCN} CH_3—CH_2—CN$

160. Ans (4)



164. Ans (2)

Fact

165. Ans (3)

NCERT (XI) Pg. # 357 (Pb. No. 12.21)

166. Ans (3)

n must be greater than ℓ

167. Ans (1)

$E_{Al} = 9, 2.7 = \dfrac{9 \times Q}{96500}$ $\left\{ w = \dfrac{E \times Q}{96500} \right\}$

168. Ans (4)

Arrange in decreasing order of SRP

169. Ans (2)

Isotonic means same osmotic pressure

$\therefore$ same concentration

$$\frac{5 \times 10}{M\,M_{urea}} = \frac{2 \times 10}{M\,M_{sub}} \qquad \{M\,M_{urea} = 60\}$$

170. Ans (4)

$$d = \frac{P \times MM}{R \times T} = \frac{2 \times 44}{0.0821 \times 400}$$

171. Ans (3)

$$P_4 + 3O_2 \xrightarrow[\text{yield}]{80\%} P_4O_6$$

$n_{P_4} = \dfrac{62}{124} = 0.5$ $\quad n_{P_4O_6} = 0.5 \times 0.8$

$\downarrow \quad = 0.4$

Mass of $P_4O_6 = 0.4 \times 220$

$= 88$ g

172. Ans (2)

Eq. wt of metal = E_M, Eq. wt. of metal oxide

$= E_M + 8 = 24$

$E_M = 16$

Eq. wt of chloride = $E_M + E_{Cl} = 16 + 35.5 = 51.5$

173. Ans (4)

Longest λ of balmer in He^+ Shorterst λ of lyman in H

$n_2 = 3$ $\quad z = 2$ $\qquad\qquad$ $z = 1$ $\quad n_2 = \infty$

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

$n_1 = 2 \qquad\qquad\qquad\qquad\qquad\qquad n_1 = 1$

$$\frac{1}{\lambda_1} = R \times 2^2 \left[\frac{1}{2^2} - \frac{1}{3^2}\right] \qquad \frac{1}{\lambda_2} = R \times 1^2 \left[\frac{1}{1^2} - \frac{1}{\infty^2}\right]$$

$$\frac{5}{9x} = R \times 4 \left[\frac{9-4}{4 \times 9}\right] \qquad \frac{1}{\lambda_2} = R$$

$$\frac{1}{x} = R \qquad \Rightarrow \lambda_2 = \frac{1}{R} = x$$

174. Ans (2)

$Al(OH)_3 \rightleftharpoons Al^{+3} + 3OH^-$

$\qquad\qquad S' \qquad 3S' + 0.1$

$K_{sp} = (Al^{+3})\,(OH^-)^3$

$1.9 \times 10^{-33} = (s')\,(3s' + 0.1)^3$

$1.9 \times 10^{-33} = S' \times 10^{-3}$ $\quad \left\{ \begin{matrix} 3s' << 0.1 \\ \therefore 3s' + 0.1 \approx 0.1 \end{matrix} \right\}$

$S' = 1.9 \times 10^{-30}$

175. Ans (3)

$NH_4COONH_4(s) \rightleftharpoons 2NH_3(g) + CO_2(g)$

$\qquad\qquad\qquad\qquad 2P \qquad P$

$K_p = (P_{NH_3})^2 (P_{CO_2})$

$108 \times 10^{-6} = (2P)^2\,(P)$

$108 \times 10^{-6} = 4P^3$

$P = 3 \times 10^{-2}$

Total pressure $= 3P = 9 \times 10^{-2}$

176. Ans (3)

Refer NCERT exampler class 12 chapter 3

177. Ans (2)

S-I

pH of solution of salt of WA & WB is given as

$$pH = 7 + \frac{1}{2}\,[pK_a - pK_b]$$

S-II

$$h = \sqrt{K_h} = \sqrt{\frac{K_w}{K_a \times K_b}}$$

$\therefore$ degree of hydrolysis is independent of conc.

178. Ans (2)

$A \longrightarrow B \qquad t_{1/2} = \dfrac{2.303}{k}\log 2 \qquad ...(1)$

$t = 0 \quad 100 \qquad t_{90}\% = 40$

$t_{90\%} \quad 10 \qquad 40 = \dfrac{2.303}{k}\log\left(\dfrac{100}{10}\right) \quad ....(2)$

divide (1) & (2)

179. Ans (2)

Catalyst only increases rate of reaction

180. Ans (4)

Ref. heat of solution from NCERT class 11 thermodynamics