LEADER TEST SERIES / JOINT PACKAGE COURSE

TARGET : PRE-MEDICAL 2016

Test Type : **ALL INDIA OPEN TEST** (MAJOR) Test Pattern : AIIMS

TEST DATE : 24 - 04 - 2016

ANSWER KEY

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

HINT – SHEET

1. $(\hat{a}+2\hat{b}).(5\hat{a}-4\hat{b})=0$

$5 - 4\ \hat{a}.\hat{b} + 10\,\hat{b}.\hat{a} - 8 = 0$

$6\,\hat{a}\,.\,\hat{b} = 3$

(1) (1) $\cos\theta = 3/6 = 1/2$

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

2. In the one dimensional elastic collision with one body at rest, the body moving initially comes to rest & the one which was at rest earlier starts moving with the velocity that first body had before collision.

so, if m & V_0 be the mass & velocity of body,

the change in momentum = $mV_0 \Rightarrow \int Fdt = mV_0$

$\Rightarrow \int Fdt = mV_0 \Rightarrow F = \frac{2mV_0}{\Delta t} = 2N$

4. A galvanometer can be converted into a voltmeter of given range by connecting a suitable resistance R in series of galvanometer. which is given by :

$$R = \frac{V}{I_s} - G = \frac{100}{10\times10^{-3}} - 25$$

$= 10{,}000 - 25 = 9975\Omega$

5. Energy [E] = $[ML^2\,T^{-2}]$

Velocity [V] = $[LT^{-1}]$

Time [T] = [T]

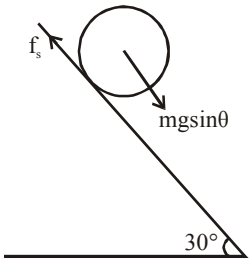
$[E] = [M]\,[LT^{-1}]^2$

or $[E] = [M]\,[V]^2$ or $[M] = [E]\,[V]^{-2}\,[T]^0$.

6. $TE = \frac{1}{2}mv^2\left(1+\frac{K^2}{R^2}\right)$

$= \frac{1}{2}mv^2\left[1+\frac{2}{5}\right] = \frac{7}{10}mv^2$

10.



$mg\sin\theta - f_s = ma$ __(1)

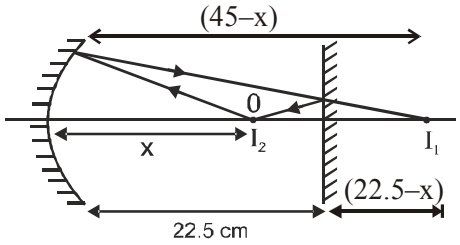
$f_s R = \frac{mR^2}{2}\alpha$ __(2)

$a = R\alpha$ __ (3)

$mg\sin\theta - f_s = 2f_s$

$f_s = \frac{mg\sin\theta}{3} = \frac{mg}{6}$

12.



I_1 is the image formed by concave mirror.

For reflection by concave mirror

$u = -x,\ v = -(45-x),\ f = -10$ cm,

$\frac{1}{-10} = \frac{1}{-(45-x)} + \frac{1}{-x}$

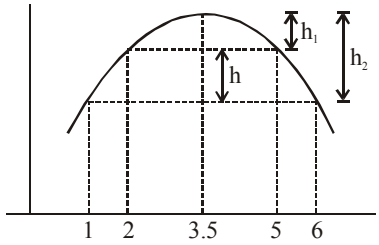
$\frac{1}{10} = \frac{x+45-x}{x(45-x)} \Rightarrow x^2 - 45x + 450 = 0$

$\Rightarrow x = 15$ cm, 30 cm

but x = 30 cm is not acceptable because x < 22.5 cm.

13. Time to reach max height

$t = \frac{2+5}{2} = 3.5\,\text{sec}$



$h = h_2 - h_1$

$h = \frac{1}{2}a(t_2^2 - t_1^2) = \frac{1}{2}a(t_2 - t_1)(t_2 + t_1)$

$= \frac{1}{2}\times 7.5(2.5-1.5)(2.5+1.5)$

h = 15 m

14. $P = \frac{\Delta V}{V}$

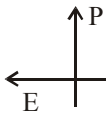
But $\Delta V = V\gamma\Delta t$

$\frac{\Delta V}{V} = \gamma\Delta t$

$P = B\gamma\Delta t \Rightarrow \Delta t = \frac{P}{B\gamma}$

15. $E = -\frac{dV}{dx}$

$E = -10x\,\hat{i}$



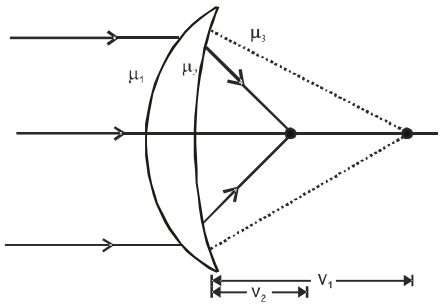
16. For refraction at first surface,

$\frac{\mu_2}{v_1} - \frac{\mu_1}{-\infty} = \frac{\mu_2 - \mu_1}{+R}$ .....(1)

For refraction at second surface,

$\frac{\mu_3}{v_2} - \frac{\mu_2}{v_1} = \frac{\mu_3 - \mu_2}{+R}$ .....(2)

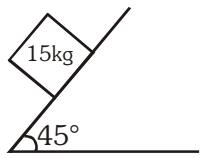
Adding Eqs. (1) and (2), we get -



$\frac{\mu_3}{v_2} = \frac{\mu_3 - \mu_1}{R}$ or $v_2 = \frac{\mu_3 R}{\mu_3 - \mu_1}$

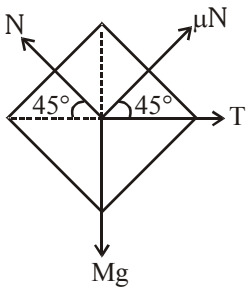
Therefore, focal length of the given lens system is $\frac{\mu_3 R}{\mu_3 - \mu_1}$

17.



$$\frac{N}{\sqrt{2}}+\frac{\mu N}{\sqrt{2}}=mg$$

$$\frac{N}{\sqrt{2}}-\frac{\mu N}{\sqrt{2}}=T=50N$$



$$=\frac{1+\mu}{1-\mu}=\frac{15\times10}{50}\Rightarrow\frac{1+\mu}{1-\mu}=3\Rightarrow\mu=\frac{1}{2}$$

18. $P_1V_1+P_2V_2=PV$

$$\frac{4T}{r_1}\left(\frac{4}{3}\pi r_1^3\right)+\frac{4T}{r_2}\left(\frac{4}{3}\pi r_2^3\right)=\frac{4T}{r}\left[\frac{4}{3}\pi r^3\right];$$

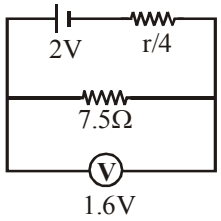
$r^2=r_1^2+r_2^2$

19. E_{eq} = 2V

r_{eq} = r/4

$$I=\frac{1.6}{7.5}=\frac{16}{75}$$

$$I=\frac{2}{\frac{r}{4}+7.5}$$



$$\frac{16}{75}=\frac{2}{\frac{r}{4}+7.5}$$

r = 7.5Ω

20. Clearly after the removal of mica sheet the new fringe width (β) is

$$\beta'=\frac{(2D)\ \lambda}{d}$$

Initial fringe shift after the introduction of mica sheet is

initial shift = $\frac{D}{d}(\mu-1)\,t$

Equating the two $\frac{2D\lambda}{d}=\frac{D}{d}(\mu-1)\,t$

$$\Rightarrow\lambda=\frac{(\mu-1)\ t}{2}=5892\ \text{Å}$$

21. Gravitational field

$$g=-\frac{\Delta V}{\Delta x}=-\left(\frac{-4}{10}\right)=\frac{4}{10}\text{J/kg m}$$

Work done in moving a mass of 2 kg from the surface to a point 5 m above the surface,

$$W=mgh=(2kg)\left(\frac{4}{10}\frac{J}{kgm}\right)(5m)=4J$$

22. volume of sphere = $\frac{40}{8}=5cc$

loss in weight = Thrust force

20 g = 1 × v × g

v = 20 cc

so, internal cavity = 20cc–5cc = 15cc

23. $\frac{x}{60}=\frac{2}{40}$

x = 3Ω

24. $K_{max}=\frac{hc}{\lambda}-\phi$

$$K_A=\frac{hc}{\lambda_A}-\phi \qquad \text{__(1)}$$

$$K_B=\frac{hc}{\lambda_B}-\phi \qquad \text{__(2)}$$

$\because\ \lambda_A=2\lambda_B$

$$K_A=\frac{hc}{2\lambda_B}-\phi \qquad \text{__(3)}$$

from eqⁿ __(2)

$$K_A=\frac{1}{2}(K_B+\phi)-\phi$$

$$K_A=\frac{K_B}{2}-\frac{\phi}{2}$$

$$K_A<\frac{K_B}{2}$$

25. Mechanical energy = kinetic energy + potential energy $E=K+U(x)$ where $K=\frac{1}{2}mv^2$

If K = 0 then E = U(x)

If F = 0 then $F=-\frac{dU(x)}{dx}=0\Rightarrow\frac{dU(x)}{dx}=0$

26. Rate of flow = Δv

square hole = $\ell^2 \times \sqrt{2gy}$

circular hole = $\pi r^2 \times \sqrt{2g(4y)}$

$\ell^2 \sqrt{2gy} = 2\times\pi R^2 \sqrt{2gy}$

$r = \frac{\ell}{\sqrt{2\pi}}$

29. By applying work energy theorem

$\Delta K.E = W_S + W_{ext\ agent}$

$0 = -\frac{1}{2}Kx^2 + Fx \Rightarrow x = \frac{2F}{K}$

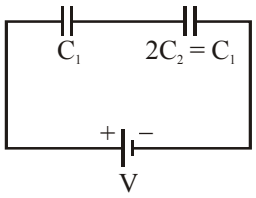
Work done $= \frac{2F^2}{K}$

30. $\frac{\Delta T}{T} = \left(\frac{1}{2}\alpha\Delta\theta\right)$

$= \frac{\Delta T}{T} = \frac{1}{2} \times 2 \times 10^{-6} \times 10 = 1 \times 10^{-5}$

% change $= \frac{\Delta T}{T} \times 100 = 1 \times 10^{-3}$

31. C_2 and C_3 are in parallel
So $V_2 = V_3$ and $C_2 = C_3$



Q = CV = const.
So voltage will be same
$V_1 = V_2 = V_3$

32. $R = R_o\left(\frac{1}{2}\right)^{\frac{t}{Th}}$

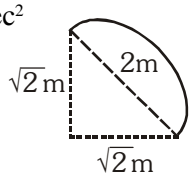
$5\times10^{-6} = 64 \times 10^{-5}\left(\frac{1}{2}\right)^{\frac{t}{3}}$

$\left(\frac{1}{2}\right)^7 = \left(\frac{1}{2}\right)^{t/3}$

$7 = \frac{t}{3}$

t = 21 day

33. $R = \sqrt{2}$ m ; $\alpha = \frac{\pi}{4}$ rad/sec^2



$\omega_0 = 0$ & $\theta = \frac{\pi}{2}$

As we know

$\theta = \omega_0 t + \frac{1}{2}\alpha t^2$

$\Rightarrow t = \sqrt{\frac{2\theta}{\alpha}} = 2$sec.

Average velocity $= \frac{\text{Total displacement}}{\text{Time}}$

$= \frac{2}{2} = 1$m/s

34. Thernal capacity H = ms

$\frac{H_1}{H_2} = \frac{m_1}{m_2} \times \frac{s_1}{s_2} = \frac{\rho_1}{\rho_2} \times \left(\frac{r_1}{r_2}\right)^3 \times \frac{s_1}{s_2}$

$\frac{H_1}{H_2} = \frac{2}{1} \times \left(\frac{1}{2}\right)^3 \times \frac{1}{3} \Rightarrow \frac{1}{12}$

35. $X_L = X_C$
So Z = R = 2Ω

$i_{rms} = \frac{V_{rms}}{Z} = \frac{100}{\sqrt{2}\cdot 2} = 25\sqrt{2}$A

$\phi = 0°$

$P_{avg} = I^2_{rms} R$

$= (25\sqrt{2})^2 \times 2$

= 2500 W

36. $\alpha = 0.96$

$i_E = 7.2$ mA

$\alpha = \frac{i_c}{i_E}$

$i_C = 0.96 \times 7.2$ mA

$i_E = i_B + i_C$

37. Total energy $= \frac{P^2}{2m_1} + \frac{P^2}{2m_2}$

$= \frac{P^2}{2}\left[\frac{1}{m_1} + \frac{1}{m_2}\right]$

$= \frac{(1\times80)^2}{2}\left[\frac{1}{1} + \frac{1}{2}\right] = 4.8$ kJ

38. $\frac{\theta_1-\theta_2}{t}=k\left[\frac{\theta_1+\theta_2}{2}-\theta_0\right]$

$\Rightarrow \frac{60-40}{7}=k\left[\frac{60+40}{2}-10\right]$ …(1)

$\frac{40-\theta}{7}=k\left[\frac{40+\theta}{2}-10\right]$ …(2)

$\frac{20}{40-\theta}=\left[\frac{40\times2}{20+\theta}\right]$

$20+\theta = 160-4\theta$

$5\theta = 140 \Rightarrow \theta = 28°C$

40. $10 - 245 \times 10^3 \times 40 \times 10^{-6} - V_{B\varepsilon} = 0$

$10 - 9.8 = V_B\varepsilon$

$V_{BE} = 0.2$ V

46. $N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$

$\Delta H = -90 = -[6\times390]+[N\equiv N+3\times435]$

50. At low pressure,

$\left(P+\frac{a}{V_m^2}\right)(V_m) = RT$

$PV_m+\frac{a}{V_m}=RT$

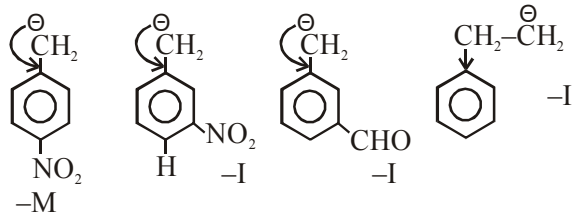
$\frac{PV_m}{RT}+\frac{a}{V_mRT}=1$

$Z = 1-\frac{a}{V_mRT}$

54. Heat of formation reaction

$S + O_2 \longrightarrow SO_2$

58.



(I) (II) (III) (IV)

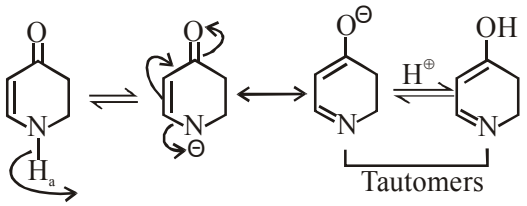
–ve charge in I, II, III are resonance stabilised IV is least stable

and stability of carbanion $\propto$ –M $\propto$ –I

–M > –I (–I of $-NO_2$ > –I of CHO)

$\therefore$ stability order $\rightarrow$ I > II > III > IV

62. Most acidic hydrogen is most likely to takes part in tautomerism, if after removing $H^{\oplus}$ –ve charge delocalised to more electronegative atom.



65. $Ag_2CO_3 \longrightarrow 2Ag + CO_2 + 1/2\ O_2$

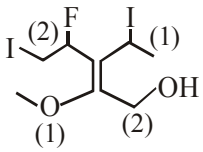
21.6g

moles of $Ag = \frac{21.6}{108} = 0.2$ mol

moles of $Ag_2CO_3 = 0.1$ mol

wt. of $Ag_2CO_3 = 0.1 \times 276$ g

66.



(1) $\rightarrow$ High priority

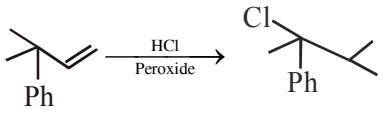
(2) $\rightarrow$ Low priority

$\because$ Same priority groups are on opposite side

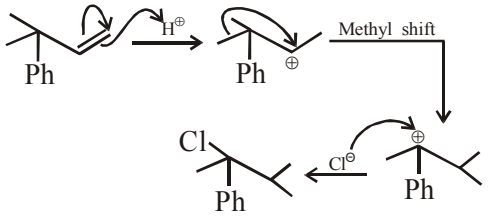
$\therefore$ E configuration

69. $K_C = \frac{[SO_3]^2}{[SO_2]^2[O_2]} = \frac{(48/80)^2}{\left(\frac{12.8}{64}\right)^2\left(\frac{9.6}{32}\right)}$

70.



Mechanism :(HCl does not show peroxide effect)



74. $RMgX + Cl–NH_2 \rightarrow R–NH_2$

87. Module, Page No. 213, 214

90. NCERT XI Pg. # 249,250

91. NCERT Pg. # 131

94. NCERT XI Pg. # 197,198

103. NCERT Pg. # 249 (E)

104. NCERT XII Pg # 79, diagram 5.7 (E)
NCERT XII Pg # 87, diagram 5.7 (H)

107. NCERT Pg. # 257 (E)

108. NCERT XII Pg # 204 (E), 222(H)

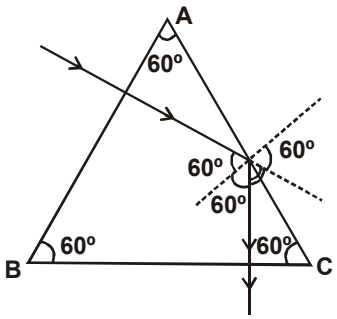
111. NCERT Pg. # 233 (E)

112. NCERT XII Pg # 75, 77, 78 (E), 83, 84, 86(H)

115. NCERT Pg. # 263 (E)

119. NCERT Pg. # 243 (E)

129. Deviation = 180 - 2 (i) = 60



157. $CH_3–\underset{\displaystyle CH_3}{\overset{|}{C}}H–COOH \xrightarrow[\Delta]{\text{Soda lime}} CH_3–CH_2–CH_3$

$CH_3–CH_2–CH_2–COOH \xrightarrow[\Delta]{\text{Soda lime}} CH_3–CH_2–CH_3$

The reaction complete through carbanion intermediate.

159. There are positively charged species that do not acts as electrophile.

Ex. $\overset{\oplus}{N}H_4$ does not act as electorphile.

162. Module, Page No. 186, 187

169. NCERT XI Pg. # 249

171. NCERT XI Pg. # 199

176. NCERT XII Pg # 76 (E), 84 (H)

178. NCERT XII Pg # 199 (E), 216 (H)

180. NCERT XII Pg # 197 (E), 215 (H)