LEADER TEST SERIES / JOINT PACKAGE COURSE

TARGET : PRE-MEDICAL 2016

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

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

HINT – SHEET

1. Resultant of two vectors $\vec{A}$ and $\vec{B}$ must satisfy $A \sim B \le R \le A + B$

2. Momentum of skater A = 30 × 1 = 30 kgm/s

Momentum of skater B = 20 × 2 = 40 kgm/s

They are at right angles to each other.

Resultant momentum = p

$\therefore (p)^2 = (30)^2 + (40)^2 = 900 + 1600 = 2500$

or P = 50 kgm/s

$\therefore$ Final velocity $= \dfrac{p}{\text{Total mass}}$

$$= \frac{50}{(30+20)} = \frac{50}{50} = 1 \text{ m/s}$$

3. $$\frac{d\theta}{dt} = \frac{\sigma A}{ms}(T^4 - T_0^4)$$

$$\frac{d\theta}{dt} \propto \frac{1}{S}$$

Line A has more slope so specific heat of A is less then B.

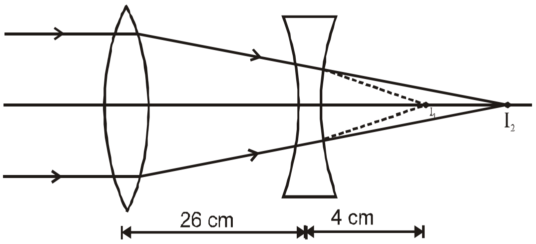
4. $$V = \frac{KQ}{r} - \frac{KQ}{3r}$$

$$V = \frac{2kQ}{3r}$$

$$E = \frac{KQ}{(3r)^2}$$

$$E = \frac{V}{6r}$$

5. Image formed by convex lens at I_1 will act as a virtual object for concave lens. For concave lens



$\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$ or $\frac{1}{v}-\frac{1}{4}=\frac{1}{-20}$ or $v = 5$ cm

magnification for concave lens

$$m=\frac{v}{u}=\frac{5}{4}=1.25$$

As size of the image at I_1 is 2 cm.

Therefore, size image at I_2 will be $2 \times 1.25 = 2.5$ cm.

6. Let $y = AB$

$$\frac{\Delta y}{y}=\frac{\Delta A}{A}+\frac{\Delta B}{B}$$

$y = 2.5 \times 0.1 = 0.25$

$$\frac{\Delta y}{0.25}=\frac{0.5}{2.5}+\frac{0.01}{0.10}$$

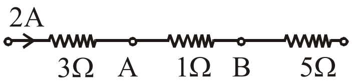
$\Rightarrow \Delta y = 0.075 = 0.08$ (2SF)

7. $v_{CM}=\frac{(1)(5)+(1)(-3)}{1+1}=1$ m/s

Position of centre of mass at t=1s

$$X_{CM}=\frac{(1)(2)+(1)(8)}{1+1}+(1)(1)=5+1=6\text{m}$$

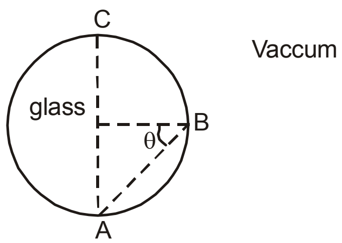
9. Given circuit can be redraw as



$V_A - V_B = IR = 2\times1 = 2V$

10. This is a case of total internal reflection.

$\therefore\ \theta > \theta_C\ (= \sin^{-1}\frac{1}{\mu})$



$\frac{1}{\mu} < \sin\theta$

$\frac{1}{\mu} < \sin 45°$

$\mu > 1/\sin 45°$

$\mu > \sqrt{2}$

$\because\ v=\frac{c}{\mu}$

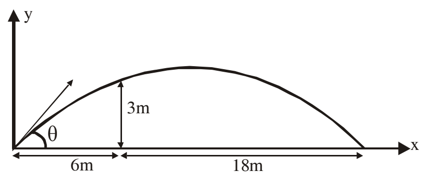
$\therefore\ v < \frac{c}{\sqrt{2}}=\frac{3\times10^8}{\sqrt{2}}$

$v < 2.1 \times 10^8$

$\therefore$ only (B) is not possible.

11. From equation of trajectory $y = x\tan\theta\left[1-\frac{x}{R}\right]$

$$\Rightarrow 3 = 6\tan\theta\left[1-\frac{1}{4}\right] \Rightarrow \tan\theta=\frac{2}{3}$$



13. $PV = nRT$

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

As volume decreases slope will increase.

14. Current in 6Ω $I=\sqrt{\frac{P}{R}}=\sqrt{\frac{6}{6}}=1$

$$I=\frac{12}{6+\frac{8P}{8+R}}$$

$$1=\frac{12}{48+14R}(8+R)$$

$R = 24\Omega$

15. Power, focal length and chromatic aberration of a lens depend on refractive index of the material of lens which, in turn, depends on wavelength of the incident light.

16. $\vec{v}_{BW}=\vec{v}_{BG}-\vec{v}_{RG}=6\hat{i}+8\hat{j}$

17. mass of each disk

$$m = \frac{\pi}{16}M$$

so $I = I_{squre} - 4I_{hole}$

$$= \frac{M(4R)^2}{6} - 4\left[\frac{mR^2}{2} + m\left(\sqrt{2}R\right)^2\right]$$

$$= \frac{8}{3}MR^2 - 10\,mR^2 \quad [\because\ m = \frac{M\pi}{16}]$$

$$= \left(\frac{8}{3} - \frac{10\pi}{16}\right)MR^2$$

18. $\frac{1}{2}Kx^2 = \frac{1}{4} \times \frac{1}{2}KA^2$

$$x^2 = \frac{A^2}{4} \Rightarrow \boxed{x = \frac{A}{2}}$$

19. Initial charge supply by battery

$$Q_1 = \frac{CV}{2}$$

Final charge supply by battery

$Q_2 = CV$

$$\Delta Q = Q_2 - Q_1 = \frac{CV}{2}$$

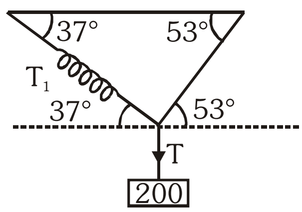
20. For path difference λ, phase difference = 2π rad

For path difference $\frac{\lambda}{4}$, phase difference = $\frac{\pi}{2}$ rad

As $K = 4I_0$ so intensity at given point where path difference is $\frac{\lambda}{4}$

$$K' = 4I_0 \cos^2\left(\frac{\pi}{4}\right) = 2I_0 = \frac{K}{2}$$

21.



In equilibrium Acc to Lami's thearum

$$\frac{200}{\sin(180-90)} = \frac{T_1}{\sin(90+53)}$$

$$\frac{200}{1} = \frac{T_1}{\cos 53}$$

$T_1 = 40 \times 3 = Kx \quad K = 3000\text{N/m}$

22. TKE $- K_T + K_R$

$$= \frac{1}{2}mv^2\left[1 + \frac{K^2}{R^2}\right]$$

But $\frac{K^2}{R^2} = \frac{1}{2}$

$$150 = \frac{1}{2}mv^2 \times (3/2)$$

$$K_T = \frac{150 \times 2}{3} = 100\text{ J}$$

23. While approaching

$$n' = n\left[\frac{v}{v - v_s}\right]$$

while leaving

$$n'' = n\left[\frac{v}{v + v_s}\right]$$

$$\Delta n = n' - n'' = nv\left[\frac{1}{v - v_s} - \frac{1}{v + v_s}\right]$$

$$= \frac{2nv_s}{v} = \frac{2 \times 240 \times 4}{320} = 6 \text{ Beats per sec.}$$

24. $E_{inside} = \frac{\rho r}{3\in_0}$

25. $\frac{1}{2}mv^2 = E - \phi$

$$= \left[\frac{12400}{3000} - 1\right]\text{ ev}$$

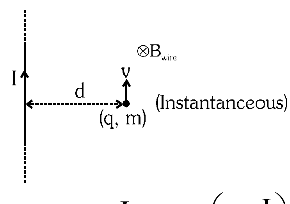
$v = 10^6$ m/s

26. $g' = g\left(1 - \frac{2h}{R}\right)$; $\frac{\Delta g}{g} = \frac{2h}{R}$

$$1 = 2\frac{h}{R} \Rightarrow \frac{h}{R} = \frac{1}{2};\ g' = g\left(1 - \frac{d}{R}\right)$$

$$\frac{\Delta g'}{g} = \frac{d}{R} \Rightarrow \frac{h}{R}$$ g decreases by 0.5%

29. Magnetic field of wire is perpendicular to the direction of motion of electron. So magnetic force on electron.



$$F_m = qvB\ (\theta = 90°), \text{ where } B = \frac{\mu_0 I}{2\pi d} = qv\left(\frac{\mu_0 I}{2\pi d}\right)$$

$$= 1{\cdot}6 \times 10^{-19} \times 10^6 \times \left(\frac{2 \times 10^{-7} \times 5}{10 \times 10^{-2}}\right)$$

$$= 1{\cdot}6\ 10^{-18}\text{ N}$$

30. $v_0 = 4V$

$K_{max} = eV_0$

$K_{max} = 4eV$

31. $F \propto \frac{1}{r^m}$; $F = \frac{C}{r^m}$

This force will provide the required centripetal force

Therefore

$$m\omega^2 r = \frac{C}{r^m} ; \ \omega^2 = \frac{C}{mr^{m+1}}$$

$$T = \frac{2\pi}{\omega} \Rightarrow T \propto r^{(m+1)/2}$$

32. Object first sink so

$mg = F_B$

$$\Rightarrow \ 8 \times \left[\frac{4}{3}\pi R^3 - \frac{4}{3}\pi r^3\right] g = 1 \times \frac{4}{3} \pi R^3 \times g$$

$$\Rightarrow \ 8\left[1 - \frac{r^3}{R^3}\right] = 1$$

$$\left(\frac{r}{R}\right) = \left(\frac{7}{8}\right)^{1/3} = \left(\frac{7^{1/3}}{2}\right)$$

33. $z = \frac{V}{I} = \frac{100}{4} = 25\Omega$

$P = VI \cos \phi$

$$P = VI \left(\frac{R}{Z}\right)$$

$$240 = 100 \times 4 \times \frac{R}{25}$$

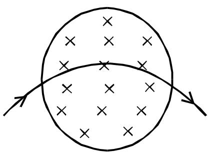
$R = 15\Omega$

$$Z = \sqrt{R^2 + X_L^{\ 2}}$$

$X_L = 20\Omega$

$$L = \frac{20}{2\pi \times 50} = \frac{1}{5\pi} H$$

34. According to right hand palm rule positive charges moves on ACW circular path in $\otimes$B and negative charges moves on CW circular path in $\otimes$B so the path shown in figure of electron (negative charge)



35. $\frac{R_N}{R_{He}} = 14^{1/3}$

$\because R \propto A^{1/3}$

$$\left(\frac{A_N}{A_{He}}\right)^{1/3} = 14^{1/3}$$

$$\frac{A_N}{A_{He}} = 14$$

$A_N = 14 \times 4 = 56$

$N+P = 56$

atomic number $= P = 56 - 30 = 26$

36. Total work done on man = 0 $\Rightarrow$ Work done by string = – work done by gravity $= -(-Mg\ell) = Mg\ell$

37. Velocity of efflux $= \sqrt{2gh}$

So force $= v\frac{dm}{dt} = \rho a v^2$

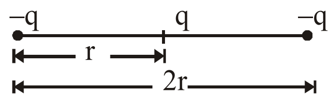
friction force $\le \mu mg$

$\rho a v^2 \le \mu \ \rho Ah)g$

$$\rho a \left(\sqrt{2gh}\right)^2 \le \mu(\rho Ah)g$$

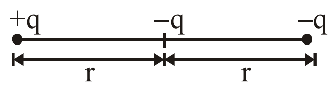
$$\mu \ge \frac{2a}{A}$$

38.



$$U_1 = -\frac{2Kq^2}{r} + \frac{Kq^2}{2r}$$

$$U_1 = \frac{-3}{2}\frac{kq^2}{r}$$



$$U_2 = -\frac{kq^2}{2r}$$

$$\frac{U_1}{U_2} = \frac{3}{1}$$

39. $F_{ext} = \frac{B^2\ell^2 v}{R} = \frac{0.15 \times 0.15 \times 0.5 \times 0.5 \times 2}{3}$

$= 3.75 \times 10^{-3}$ N

40. $m = m_0\left(\frac{1}{2}\right)^{t/t1/2}$

$\Rightarrow \frac{m}{m_0} = \frac{1}{16} = \left(\frac{1}{2}\right)^{2/t_{1/2}}$

$\Rightarrow \frac{2}{t_{1/2}} = 4$

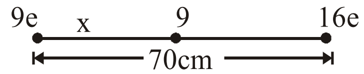
$\Rightarrow\ t_{1/2} = \frac{1}{2}$ hour.

41. By applying work energy theorem

$$\frac{1}{2}m\frac{v^2}{4} - \frac{1}{2}mv^2 = -\frac{1}{2}kx^2$$

$$\Rightarrow \frac{-3mv^2}{8} = \frac{-1}{2}kx^2\ ;\ k = \frac{3mv^2}{4x^2}$$

42. $\Delta Q = ms\Delta\theta$
$= 5 \times 10^3 \times 4.2 \times 80$
1680 KJ

43. 

for eq^m condition

$$\frac{K(9e)q}{x^2} = \frac{K(16e)q}{(70-x)^2}$$

3(70–x) = 4x
7x = 210
x = 30 cm

44. e_0 = NBAω

$$= 60 \times .5 \times 20 \times 10 \times 10^{-4} \times 2 \times \pi \times \frac{1800}{60} = 113\text{ V}$$

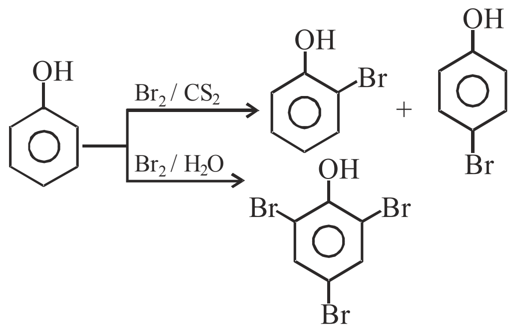
46.

$$\underset{1}{CH_3}-\underset{2}{\overset{CH_3}{\overset{|}{C}H}}-\underset{3}{C}\equiv\underset{4}{C}-\underset{5}{\overset{CH_3}{\overset{|}{C}H}}-\underset{6}{CH_3} \xrightarrow{O_3/Zn.H_2O} 2CH_3-\overset{CH_3}{\overset{|}{C}H}-\overset{O}{\overset{||}{C}}-OH$$

2,5 Dimethyl-3-hexyne

49. $HBr + H_2SO_4 \rightarrow Br_2 + SO_2$

50. $P_{He} = X_{He} \cdot P_{total} = \frac{1}{3}\times 6 = 2atm$

51. 

53. (b) mobility α $\frac{1}{\text{size of Hydrated ion}}$

(c) B.P. ⇒ $MCl_4 < MCl_2$

54. $PCl_5 + H_2O \rightarrow PoCl_3 + HCl$

$PoCl_3 + H_2O \rightarrow H_3PO_4 + HCl$

55. $N_2 \quad + \quad 3F_2 \longrightarrow 2NF_3$

mol/stoichiometric coeff. 0.25 $\frac{0.5}{3}$

$\frac{5.6}{22.4} = 0.25$ mol $\quad \frac{19}{38} = 0.5$mol

3 mol F_2 gives = 2 mol NF_3

0.5 mol F_2 gives = $\frac{2}{3}\times 0.5$ mol NF_3

$= \frac{1}{3}$ mol NF_3

wt. of NF_3 = $\frac{1}{3} \times 71$

= 23.66 g

56. The Leaving ability of different halides follow order as - $I^{\ominus} > Br^{\ominus} > Cl^{\ominus}$

57. Stability of carbocation α ERG α $\frac{1}{EWG}$

59. $E_n^Z = -\frac{2\pi^2mz^2e^4}{n^2h^2}$

P.E. = 2 × E_T

K.E. = $-E_n^Z$

60. At anode O_2 is being liberated

$$\therefore\ H_2O \longrightarrow \frac{1}{2}O_2 + 2H^+ + 2e^-$$

61. rate of SN^2 reaction $\alpha\ \frac{1}{\text{steric hindrance}}$

62.
$$\begin{array}{c} \quad H\ \ O \\ \quad |\ \ \ \| \\ H\text{–}C\text{–}C\text{–}OH \\ \quad | \\ \quad NH_2 \end{array}$$

Glycine $\rightarrow$ does not have chiral center

65. $E^o_{H^+/H_2}$ is higher than $E^o_{Al^{+3}/Al}$

$\therefore$ H_2 is obtained

66. Kolbe reaction to form salicylic acid is an electrophilic substitution reaction.

67. $n\,CH_2 = \underset{}{CH(Cl)} \longrightarrow \left(CH_2 - CH(Cl)\right)_n$

Vihyl chloride   PVC

68. $[NiCl_4]^{2-}$, $Ni^{+2} = 3d^8$ but Cl^- is WfL

So, geometry of complex = Tetrahedral

69. $K_C^1 = \frac{1}{K_C^2} = \frac{1}{81}$

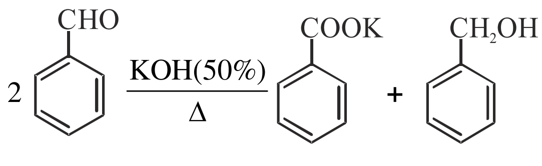
$$K_P = K_C(RT)^{-2} = \frac{1}{81(R\times500)^2}$$

70. $\sqrt{3}a = 2(r_+ + r_-)$

$$a = \frac{2(r_+ + r_-)}{\sqrt{3}} = \frac{(1.69+1.81)}{\sqrt{3}}$$

$$= \frac{2\times3.50}{1.732} = 4.03\text{Å}$$

71.



Cannizzaro reaction

72. Asprin is analgesic as well as Antipyretics

74. $H^+ = 10^{-2}$

pH = 2

pH + pOH = 12

pOH = 10

75. Specific rate of reaction is affected by temperaturre and catalyst.

76. $CH_3\text{–}CH_2\text{–}CN \xrightarrow{H_3O^{\oplus}} CH_3\text{–}CH_2\text{–}\overset{O}{\overset{\|}{C}}\text{–}OH$

Ethyl cyanide

78.

	NH_2^-	NH_3	NH_4^+
	sp^3	sp^3	sp^3
l.P	2	1	0

79. $C_{17}H_{19}NO_3 + H^{\oplus} \longrightarrow C_{17}H_{20}NO_3^+$

81. $R\text{–}\overset{O}{\overset{\|}{C}}\text{–}O\text{–}\overset{O}{\overset{\|}{C}}\text{–}R + R'\text{–}\ddot{N}H_2 \rightarrow R\text{–}\overset{O}{\overset{\|}{C}}\text{–}NH\text{–}R' + R\text{–}\overset{O}{\overset{\|}{C}}\text{–}OH$

amide

83. $NaCl \rightarrow Na^+ + Cl^-$

$H_2O \rightarrow H^+ + OH^-$

at cathode $\Rightarrow H_2$

at Anode $\Rightarrow Cl_2$

by product $\Rightarrow$ NaOH

84. H_2SO_4 and $Ba(OH)_2$ are strong acid and base respectively.

86. $CH_3\text{–}\overset{O}{\overset{\|}{C}}\text{–}\overset{O}{\overset{\|}{C}}\text{–}\overset{O}{\overset{\|}{C}}\text{–}Cl$

4   3   2   1

2,3 Dioxo butanoyl chloride

87. $[Sc(H_2O)_6]Cl_3 \rightarrow Sc^{+3} = 3d^{\circ}$ colourless

88. $Fe^{3+} = 3d^5$ < eg: ↿ ↿ ; t_{2g}: ↿⇂ ↿⇂ ↿

89. $W = -2.303\ nRT \log_{10}\frac{V_2}{V_1}$

92. NCERT (XI^{th}) Pg. # 42, 43
94. NCERT (XI^{th}) Pg. # 107
95. NCERT (XI^{th}) Pg. # 287
100. NCERT (XII^{th}), Page-187(E), 204(H)
101. NCERT Pg. # 93, 91 (E)
102. NCERT (XI^{th}) Pg. # 36
104. NCERT (XI^{th}) Pg. # 249
105. NCERT (XI^{th}) Pg. # 298
111. NCERT (XI^{th}) Pg. # 93, 94 (E)
115. NCERT (XI^{th}) Pg. # 311
125. NCERT (XI^{th}) Pg. # 307
132. NCERT (XI^{th}) Pg. # 54
134. NCERT (XI^{th}) Pg. # 195
138. NCERT Page-250
140. NCERT (XII^{th}), Page-289(E), 315, 316(H)
142. NCERT (XI^{th}) Pg. # 51
144. NCERT (XI^{th}) Pg. # 189
145. NCERT (XI^{th}) Pg. # 336
151. NCERT (XI^{th}) Pg. # 36
152. NCERT (XI^{th}) Pg. # 269
153. NCERT (XI^{th}) Pg. # 152, para-1, Line-6,7
154. NCERT (XI^{th}) Pg. # 262, 263
155. NCERT (XI^{th}) Pg. # 306
157. NCERT Page-254(E)
160. NCERT (XII^{th}), Page-186(E), 202(H)
161. NCERT (XI^{th}) Pg. # 38, 39
162. NCERT (XI^{th}) Pg. # 271, 272
164. NCERT (XI^{th}) Pg. # 260
165. NCERT (XI^{th}) Pg. # 333
170. NCERT (XII^{th}), Page-84 Fig. 5.11 (E), 92(H)
171. NCERT (XI^{th}) Pg. # 36, 38
172. NCERT (XI^{th}) Pg. # 274
174. NCERT (XI^{th}) Pg. # 270, 271, 272
175. NCERT (XI^{th}) Pg. # 326
177. NCERT Page-235(E)
179. NCERT (XII^{th}), Page-213(E), 232(H)
180. NCERT (XII^{th}), Page-199, 200, 203, 211(E), 217, 221, 230(H)