LEADER TEST SERIES / JOINT PACKAGE COURSE

TARGET : PRE-MEDICAL 2016

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

TEST DATE : 21 - 02 - 2016

ANSWER KEY

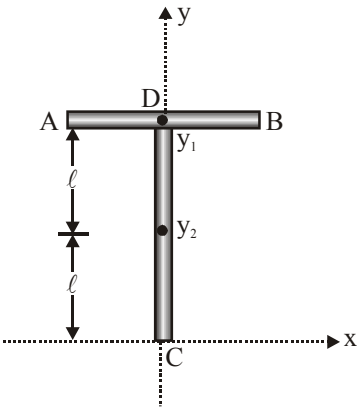
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	4	3	4	2	2	4	3	1	2	1	1	3	3	1	3	2	2	2
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	3	2	1	1	1	1	1	3	4	2	1	3	3	3	3	3	2	3	1
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	2	1	1	4	3	1	4	2	1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

HINT – SHEET

2. For translatory motion the force should be applied on the centre of mass of the body. So we have to calculate the location of centre of mass of 'T' shaped object.

Let mass of rod AB in m so the mass of rod CD will be 2m.

Let y_1 is the centre of mass of rod AB and y_2 is the centre of mass of rod CD. We can consider that whole mass of the rod is placed at their respect at their respective centre of mass i.e., mass m is placed at y_1 and mass 2m is placed at y_2.



Taking point 'C' at the origin position vector of point y_1 and y_2 can be written as $\vec{r}_1 = 2\ell\hat{j}, \vec{r}_2 = \ell\hat{j}$, and m_1 = m and m_2 = 2m

Position vector of centre of mass of the system

$$\vec{r}_{cm}=\frac{m_1\vec{r}_1+m_2\vec{r}_2}{m_1+m_2}=\frac{m_2\ell\hat{j}+2m\ell\hat{j}}{m+2m}=\frac{4m\ell\hat{j}}{3m}=\frac{4}{3}\ell\hat{j}$$

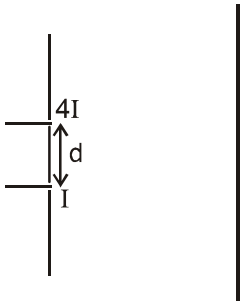
Hence the distance of centre of mass from

$C=\frac{4}{3}\ell$.

9. $t=\sqrt{\frac{2h}{(g+a)}}=\sqrt{\frac{2\times2.7}{(9.8+1.2)}}=\sqrt{\frac{5.4}{11}}=\sqrt{0.49}=0.7\text{sec}$

As u = 0 and lift is moving upward with acceleration

12. If d = λ, then maximum path difference will be less than λ. So there will be only central maximum on the screen.
If λ < d < 2λ, then the maximum path difference will be less than 2λ.
So there will be two more maximum on screen corresponding to path difference Δx = λ
So (A) and (B) are correct.



Intensity of dark fringe becomes zero when intensities
of two slits are equal. Initial intensity at both the slits are unequal so
there will some brightness at dark fringe. Hence when intensity of both slits is made same the intensity at dark on screen shall decrease to zero. So both (C) and (D) are false.

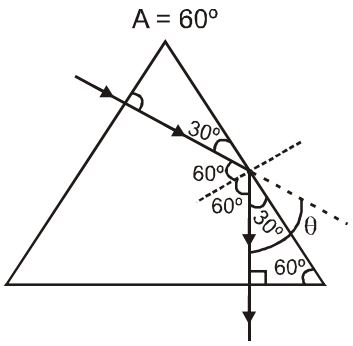
13. When body is released from the position p (inclined at angle θ from vertical) then velocity at mean position

$$v=\sqrt{2g\ell(1-\cos\theta)}$$

∴ Tension at the lowest point = $mg+\frac{mv^2}{\ell}$

= $mg+\frac{m}{\ell}[2g\ell(1-\cos60^\circ)]=mg+mg=2mg$

16.



Here $i_c=\sin^{-1}\frac{1}{1.5}=\sin^{-1}\frac{2}{3}<60^\circ$

So, T.I.R. takes place at second surface

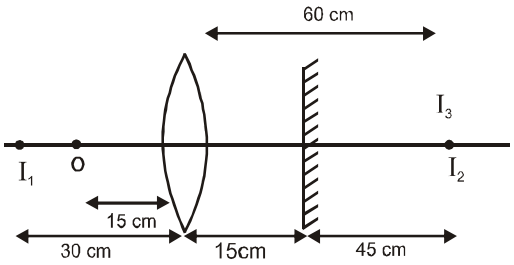
θ + 120° = 180° θ = 60°

17. Acceleration $a=\frac{1}{m}\left(\frac{-dm}{dt}\right)v_r=\frac{1}{1}\left(\frac{1}{60}\right)\times2400$

$=40ms^{-2}$

20. $\frac{1}{f}=\frac{1}{v}-\frac{1}{4}$ $\frac{1}{+30}=\frac{1}{v}-\frac{1}{-15}$

$\frac{1}{v}=\frac{1}{30}-\frac{1}{15}=-\frac{1}{30}$ v = – 30



For plane mirror

u = – 30 – 15 = – 45 cm ⇒ v = + 45 cm

For second refraction

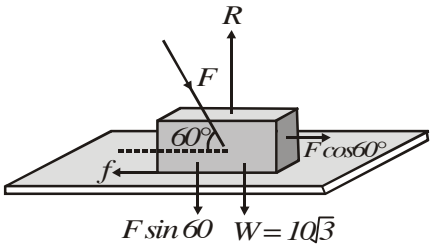
u = – 60, f = 30 cm

$\frac{1}{30}=\frac{1}{v}-\frac{1}{-60}$

$\frac{1}{v}=\frac{1}{30}-\frac{1}{60}=+\frac{1}{60}$ v = + 60 cm

final image is real and 60 cm left from lens.

21.



$f = \mu R \Rightarrow F\cos 60° = \mu(W + F\sin 60°)$

Substituting $\mu = \frac{1}{2\sqrt{3}}$ & $W = 10\sqrt{3}$

we get F = 20 N.

24. $ev_0 = \frac{12400}{\lambda} - \phi$

25. $W = \int_A^B F_x dx \Rightarrow W = \int_{x=4}^{=-2} (-6x^3)dx$

$= -6\left[\frac{x^4}{4}\right]_{x=4}^{x=-2} = \left(\frac{-3}{2}\right)(-240) = 360\,J$

27. Potential gradient

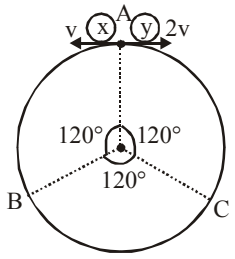
$x = \left(\frac{5}{0.5+4.5}\right)\left(\frac{4.5}{3}\right) = 1.5\ Vm^{-1}$

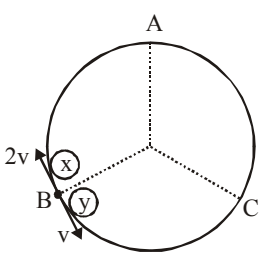
Here (x) (AC) = 3 $\Rightarrow AC = \frac{3}{1.5} = 2m$

28. $\lambda = \frac{h}{\sqrt{2mk}}$

29. Let initially particle x is moving in anticlockwise direction and y in clockwise direction.

As the ratio of velocities of x and y particles are $\frac{v_x}{v_y} = \frac{1}{2}$, therefore ratio of their distance covered will be in the ratio of 2 : 1. It means they collide at point B.





After first collision at B, velocities of particles get interchanged, i.e., x will move with 2v and particle y with v.

Second collision will take place at point C. Again at this point velocities get interchanged and third collision take place at point A.

So, after two collision these two particles will again reach the point A.

32. $\mu = \frac{A_{max} - A_{min}}{A_{max} + A_{min}}$

33. Change in momentum= Impulse

= Area under force-time graph

$\therefore$ mu = Area of trapezium

$\Rightarrow mu = \frac{1}{2}\left(T + \frac{T}{2}\right)F_0 \Rightarrow mu = \frac{3T}{4} F_0$

$\Rightarrow F_0 = \frac{4mu}{3T}$

37. $v_0 = \frac{v_e}{\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}\,km/s$

40. apply KVL

$8 - 0.5 - 2.2 \times 10^3\, I = 0$

41. 1.0 L of mixture X contain 0.01 mole of each $[CO(NH_3)_5SO_4]Br$ and $[CO(NH_3)_5Br]SO_4$.

Also, with $AgNO_3$, only $[CO(NH_3)_5SO_4]Br$ reacts to give AgBr.

$$\underset{1.0\,mol}{[CO(NH_3)_5SO_4]Br} + \underset{excess}{AgNO_3} \longrightarrow$$

$$[CO(NH_3)_5SO_4]NO_3 + \underset{1.0\,mol}{AgBr}$$

$BaCl_2$ only reacts with $[CO(NH_3)_5Br]SO_4$ to give $BaSO_4$.

$$\underset{1.0\,mol}{[CO(NH_3)_5Br]SO_4} + \underset{excess}{BaCl_2} \longrightarrow$$

$$[CO(NH_3)_5Br]Cl_2 + \underset{1.0\,mol}{BaSO_4}$$

42. Cell reaction

$$2H^+ + \frac{1}{2}O_2 + Fe(S) \longrightarrow H_2O(\ell) + Fe^{2+}$$

$E^0_{Cell} = 1.23 - (-0.44) = 1.67$

$\Delta G^\circ = -2 \times 96500 \times 1.67$ J

$\simeq -322$ kJ

43. As size of SA ↑, Bond Angle also ↑

45. n–factor for Mohr's salt is 1

n–factor for dichromate is 6

Gram equivalent of dichromate = Gram equivalent of Mohr's salt

46. $\boxed{\text{Protection power} \propto \frac{1}{\text{Gold number}}}$

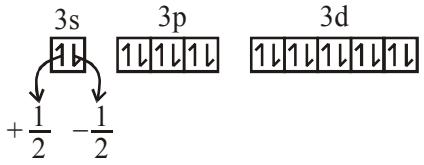
47. O_2, BO = 2

O_2^- BO = 1.5

O_2^{2-} BO = 1

O_2^+ BO = 2.5

53. For n = 3



57. m mol of base = $2.5 \times \frac{2}{5} = 1$

m mol of acid required to reach the end point = 1

→ Volume of acid required to reach the end point

$= \frac{15}{2}$mL

→ Total volume at the end point = 10 mL

Molarity of salt at end point = $\frac{1}{10} = 0.1$M

$B^+ + H_2O \rightleftharpoons BOH + H^+$

C–CH – Ch Ch

$$k_h = \frac{k_w}{k_b} = \frac{10^{-14}}{10^{-12}} = 10^{-2}$$

$$k_h = \frac{Ch^2}{1-h} = \frac{0.1 \times h^2}{1-h}$$

$10h^2 + h - 1 = 0$

$$h = \frac{-1 \pm \sqrt{1+40}}{20} = 0.27$$

$(H^+) = Ch = 0.1 \times 0.27 = 0.027$ M

58. $[FeF_6]^{3-} \Rightarrow$ unpaired $e^- = 5$

$[\overline{C}_0F_6]^{3-} \Rightarrow$ unpaired $e^- = 4$

$[v(H_2O)_8]^{3p}$ unpaired $e^- = 2$

$[Ti(Mo)6]^{3+}$ unpaired $e^- = 1$

magnetic moment α No. of unpaired e^-

62. As extent of synergic bond ↑,

⇒ C-O bond length ↑

⇒ C-O bond strength ↓

In $[Mn(CO)_6]^+$ synergic bonding in minimum and hance C–O bond strength is maximum

63. $\overset{+}{M}\ \overset{-}{F} + XeF_4 \longrightarrow \overset{+}{M}\ XeF_5^{\ominus}$

⇒ All IA fluorides are $\overline{F}$ donor

⇒ $XeF_5^{\ominus} \rightarrow sp^3d^3$

→pentagonal planer.

66. Self reduction step

$Pbs + O_2 \rightarrow PbO + SO_2$

$PbO + \underset{(RA)}{Pbs} \rightarrow Pb + SO_2$

69. $T_1V_1^{\gamma-1} = T_2V_2^{\gamma-1}$

77. $\pi_{Na_2SO_4} = \pi_{Glucose}$

$i \times 0.004 = 0.01$

$i = 2.5$

$i = 1 - \alpha + 3\alpha$

$2.5 = 1 + 2\alpha$

$\alpha = 0.75$

78. $\boxed{\mu \times \frac{1}{Q}}$

Dipole moment

89. NCERT Pg. # 36

93. Module-I Pg. # 69

94. NCERT-XI Pg. # 252

96. NCERT-XII, Pg.# 49

97. Module-I Pg. # 76

99. NCERT Pg. # 147

100. NCERT-XII, Pg.# 50

104. NCERT XII, Pg.# 70 (E), 78 (H)

108. NCERT XII, Pg.# 83,84 (E), 92,93 (H)

109. NCERT-XI Pg. # 136 (E) para/last line

112. NCERT XII, Pg.# 195, 196 (E), 212, 213(H)

113. NCERT-XI Pg. # 163 (E) para/line 6, 7, 8

116. NCERT XII, Pg.# 289 (E), 315 (H)

117. NCERT Pg. # 96 fig. 9.1

120. NCERT XII, Pg.# 91 (E), 100 (H)

144. HOF < HOCl (Bond Angle)

148. $Na[Ag(CN)_2] + Zn \rightarrow Na_2[Zn(CN)_4] + Ag \downarrow$

$\Rightarrow$ Zn, Cd, Hg are not transition element

155. $SnO < SnO_2$ (Acidic character)

$\Rightarrow$ There for SnO is more reactive towards acid.

159. In $\left[Co(NH_3)_6\right]^{2+}$, the unpaired e^- is in nd (higher energy subshell)

$\Rightarrow$ Lost easily

$\Rightarrow$ easily oxidised.

163. NCERT Pg. # 20

164. NCERT Pg # 276 para 4

167. NCERT Pg. # 143 para 2 line 1, 2, 3

169. NCERT-XI Pg. # 158

170. NCERT, Pg.# 21 (E), 22(H)

171. NCERT-XI Pg. # 199

172. NCERT, Pg.# 25 (E), 26(H)

176. NCERT XII, Pg.# 183 (E), 199 (H)

178. NCERT XII, Pg.# 85 (E), 94 (H)

180. NCERT XII, Pg.# 211 (E), 229 (H)