Enthusiast, Leader & Achiever Course

PHASE : (All Phase)

TARGET : PRE-MEDICAL 2020

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

TEST DATE : 21-05-2020

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.	4	3	2	4	2	4	3	3	4	4	3	1	4	1	1	1	3	2	3	4	4	1	2	3	3	4	3	3	4	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.	4	1	1	2	1	1	4	3	4	1	1	2	4	4	4	4	3	2	1	2	3	1	1	2	2	1	1	1	2	2
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.	1	4	3	1	1	3	4	4	2	3	3	4	4	2	3	3	1	4	4	4	2	1	3	1	4	2	2	2	2	3
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.	1	2	1	4	2	1	2	2	2	3	1	1	3	4	3	4	4	4	2	2	2	3	1	1	3	1	2	2	3	1
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.	3	2	3	1	3	2	4	1	1	3	4	1	2	4	1	2	3	2	3	2	1	4	3	3	1	3	2	3	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	4	4	2	2	4	3	2	2	4	2	1	1	4	4	3	2	4	3	2	4	2	2	3	3	1	2	2	1	1

HINT – SHEET

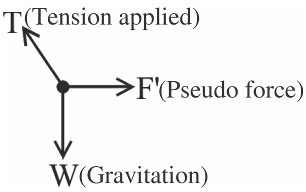
1. Ans (4)

$F_{lim} \geq f_s = f_c$

$\mu\, mg \geq m\, \omega^2 R$

$R \leqslant \frac{\mu g}{\omega^2}$

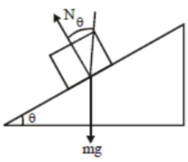
2. Ans (3)



3. Ans (2)

$N \cos\theta = mg$ .....(1)

$N \sin\theta = \frac{mv^2}{r}$ ......(2)



$$\boxed{\tan\theta = \frac{v^2}{rg}}$$

4. Ans (4)

Let the velocity at the top point is v_C. Then for projectile motion from C to A.

Range = $v_c \sqrt{\frac{2(\text{height})}{g}} \Rightarrow 3R = v_c\sqrt{\frac{2 \times 2R}{g}}$

$\Rightarrow v_C = \frac{3}{2}\sqrt{Rg}$

To find velocity at B, apply conservation of energy,

i.e., $\frac{1}{2}mv_B^2 = mg2R + \frac{1}{2}mv_C^2 \Rightarrow v_B = \frac{5}{2}\sqrt{Rg}$

5. Ans (2)

$\sigma\left[\pi R^2 - a^2\right] x_{COM} = \sigma a^2\left(\frac{a}{2}\right)$

$\therefore\ x_{COM} = \frac{a^3}{2\left[\pi R^2 - a^2\right]}$

6. Ans (4)

$x_{cm_f} = x_{cm_i} + v_{cm} \times t$

Here $v_{cm} = \frac{4 \times 2 - 4 \times 2}{4 + 4} = 0$

$x_{CM} = \frac{4 \times 0 + 4 \times 4.5}{4 + 4} = 2.25\text{m}$

$y_{cm} = 0$

7. **Ans (3)**

As momentum is conserved so answer will be (3)

8. **Ans (3)**

When the block is moving over wedge, let their common horizontal velocity be v

By the momentum conservation

$mv_0 = (m + M)v$ ..(i)

$\frac{1}{2}mv_0^2 = \frac{1}{2}(m+M)\,v^2 + mgh$ ..(ii)

$\frac{1}{2}mv_0^2 = \frac{1}{2}(m+M)\left(\frac{mv_0}{m+M}\right)^2 + mgh$

$v_0^2\left(1 - \frac{m}{m+M}\right) = 2h$

$\Rightarrow v_0 = \sqrt{\frac{2gh\,(m+M)}{M}}$

9. **Ans (4)**

$W = Fx\cos\theta = 10 \times 4 \times \cos 60 = 20$ Joule

10. **Ans (4)**

If there is no air drag then maximum height

$H = \frac{u^2}{2g} = \frac{14 \times 14}{2 \times 9.8} = 10\,m$

But due to air drag ball reaches up to height 8m only. So loss in energy

$= mg(10-8) = 0.5 \times 9.8 \times 2 = 9.8\,J$

11. **Ans (3)**

Spring force is a conservative force but does not follow inverse square law

so option (3) is false.

12. **Ans (1)**

Initial P.E. $U_i = -\frac{MgL}{2n^2}$

Final P.E. $U_f = -\frac{MgL}{2}$

Conservation of mechanical energy

$-\frac{MgL}{2n^2} + \frac{MgL}{2} = \frac{1}{2}mv^2$

$v = \sqrt{gL\left(1 - \frac{1}{n^2}\right)}$

13. **Ans (4)**

P = constant

So,

$v \propto t^{1/2}$ ....(i)

$x \propto t^{3/2}$ ....(ii)

by (i) and (ii)

$x \propto v^3$

14. **Ans (1)**

$\frac{mV^2}{r} = mg \quad V = \sqrt{rg} = \sqrt{1.6 \times 10}$

V = 4 m/s

15. **Ans (1)**

F_{net} toward centre is always $\frac{mv^2}{r}$

16. **Ans (1)**

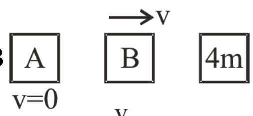
$\because \tau = I\alpha \quad \therefore (mg)\frac{\ell}{2} = \left(\frac{m\ell^2}{3}\right)\alpha \Rightarrow \alpha = \frac{3g}{2\ell}$

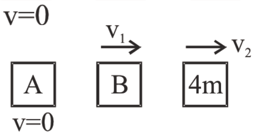
17. **Ans (3)**

$I_1 = \frac{2}{5}mr_1^2, I_2 = \frac{2}{3}mr_2^2$

$I_1 = I_2 \Rightarrow \frac{r_1^2}{5} = \frac{r_2^2}{3} \Rightarrow \frac{r_1}{r_2} = \sqrt{\frac{5}{3}}$

18. **Ans (2)**

1st collision between A and B 

2nd collision between B and C 

$e = 1 = \frac{V_2 - V_1}{V} \Rightarrow V_2 - V_1 = V$ .....(1)

C.O.M. $\Rightarrow mv = 4mv_2 + mv_1$

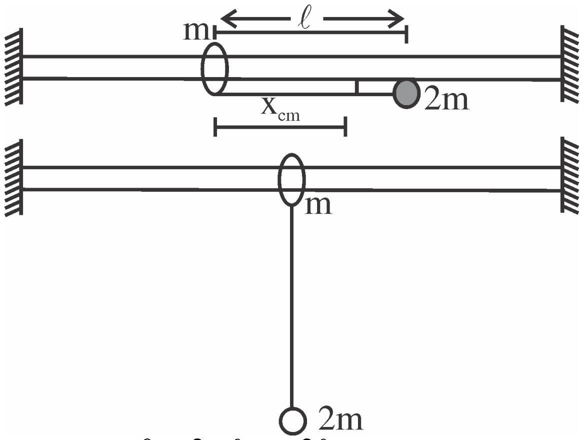
$\Rightarrow 4v_2 + v_1 = v$ ......(2)

Solving (1) and (2) $v_2 = 0.4\,V$; $v_1 = -0.6\,V$

3rd collision between B and A

$\therefore$ Final velocity of A is 0.6 V towards left.

19. Ans (3)



$$x_{cm} = \frac{m \times 0 + 2m\ell}{m + 2m} = \frac{2\ell}{3}$$

$$x_{cm} = \frac{2}{3} \times 1.2 = 0.8m$$

20. Ans (4)

$\theta = 60°$

$F_1 = F_2$

$F_{net} = \sqrt{3}\,F$

$$F_{net} = \sqrt{3}\frac{Gm^2}{a^2}$$

21. Ans (4)

75% of g reduces means

$g' = 27\%$ of $g \Rightarrow g' = \frac{g}{4}$

$$g' = \frac{g}{\left(1 + \frac{h}{R}\right)^2} = \frac{g}{4} \Rightarrow h = R$$

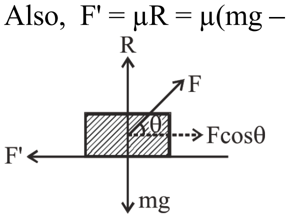
23. Ans (2)

Because the block moves with a uniform velocity, the resultant force is zero. Resolving F into horizontal component F cos θ and vertical component F sin θ, we get ;

$R + F\sin\theta = mg$

or $R = mg - F\sin\theta$ ..... (i)

Also, $F' = \mu R = \mu(mg - F\sin\theta)$



$(\because s = d)$

But, $F\cos\theta = F'$

or $F\cos\theta = \mu\,(mg - F\sin\theta)$

or $F(\cos\theta + \mu\sin\theta) = \mu mg$

$$\therefore\ F = \frac{\mu mg}{\cos\theta + \mu\sin\theta}$$

24. Ans (3)

$$P = F.V = \left(m\frac{dv}{dt}\right)V$$

$$\int vdV = \frac{P}{m}\int dt$$

$$v^2 = \frac{2P}{m}t$$

$$\frac{dx}{dt} = \sqrt{\frac{2P}{m}t}$$

$$\int dx = \int\sqrt{\frac{2pt}{m}}\,dt$$

$$x = \sqrt{\frac{2P}{m}}\ \frac{t^{3/2}}{3/2}$$

25. Ans (3)

When the balt is released from the top of tower then ratio of distance covered by the balt in first, second and third second

$h_I : h_n : h_m = 1 : 3 : 5$ [Because $h_n \propto (2n - 1)$]

$\therefore$ Ratio of work done $mgh_I : mgh_{II} : mgh_{II} : mgh_{III}$

$= 1 : 3 : 5$

26. Ans (4)

$v = \ell^3$

$$\frac{\Delta v}{v} = \frac{3\Delta\ell}{\ell} = \frac{3}{100}\left(\frac{\Delta\ell}{\ell} \times 100\right)$$

$$= \frac{3}{100} \times 1 = 0.03$$

27. Ans (3)

$\rho_1 h_1 = \rho_2 h_2$

$13.6 \times 2 = 1 \times h$

$h = 27.2$ cm

28. Ans (3)

$u=5.0$ m/s, $v^x = u^2 + 2as$

$v^2 = (5.0)^2 + 2(10)(3.75) = 25 + 7.5$

$v = 10$ m/s

$$A_2V = A_1u \Rightarrow A_2 = 10^{-4} \times \frac{5.0}{10}$$

$A_2 = 5.0 \times 10^{-5}\ m^2$

29. Ans (4)

$$I = \frac{m}{3}(\ell\sin 30°)^2 = \frac{m\ell^2}{12}$$

30. Ans (3)

$\vec{\tau} = \vec{r} \times \vec{F}$

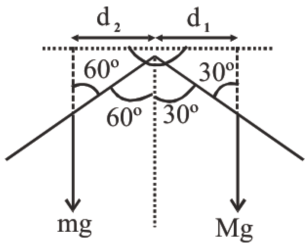
Force acts on origin

so $\vec{r}$ is position vector of origin wrt.

$(1,-1)$ so $\vec{r} = \vec{r} = -\hat{i} + \hat{j}$, $\vec{F} = -F\hat{k}$

$\vec{\tau} = (-\hat{i} + \hat{j}) \times (- - F\hat{k}) = -F\hat{j} - F\hat{j}$

31. Ans (4)



Net torque about O should be zero

$Mg\, d_1 = mg\, d_2$

$\Rightarrow Mg\frac{\ell}{2}\sin 30^0 = mg\frac{\ell}{2}\sin 60^0$

$\frac{M}{m} = \frac{\sin 60^\circ}{\sin 30^\circ} = \sqrt{3}$

32. Ans (1)

$\vec{L} = m(\vec{r} \times \vec{v})$

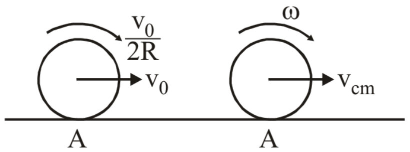
$= 1\,[(10\,\hat{i} + 6\hat{j}) \times (5\hat{i})]$

$= -30\,\hat{k}$

33. Ans (1)

For a particle performing uniform circular motion net torque w.r.t. centre is zero, because line of action of force passes through centre. So angular momentum remains conserved w.r.t. centre.

34. Ans (2)



Conservation of angular momentum about A

$\Rightarrow MvR + I\omega$

$mv_0R + \frac{2}{5}(mR^2)\left(\frac{V_0}{2R}\right)$

$= mV_{cm}R + \left(\frac{2}{5}mR^2\right)\left(\frac{V_{cm}}{R}\right)$

$V_{cm} = \frac{6V_0}{7}.$

35. Ans (1)

From mechanical energy conservation,

$\frac{1}{2}mv^2 - \frac{3GMm}{2R} = 0 + 0$

$\Rightarrow v = \sqrt{\frac{3GM}{R}}\;= \sqrt{1.5}\,v_e$

36. Ans (1)

When a planet revolves around the sun, its areal velocity is constant.

$\therefore \frac{A_1}{t_1} = \frac{A_2}{t_2} = \frac{A_3}{t_3}$

$\frac{A_1}{2} = \frac{A_2}{3} = \frac{A_3}{6} \Rightarrow 3A_1 = 2A_2 = A_3$

37. Ans (4)

By energy conservation

$-\frac{GMm}{R} + \frac{1}{2}m\frac{1.5GM}{R} = -\frac{GMm}{R+h}$

$\frac{1}{4R} = \frac{1}{R+h} \quad \Rightarrow \quad h = 3R$

38. Ans (3)

$W = 8\pi T\,(r_2^2 - r_1^2) = 8\pi T\left[\left(\frac{2}{\sqrt{\pi}}\right)^2 - \left(\frac{1}{\sqrt{\pi}}\right)^2\right]$

$\therefore W = 8 \times \pi \times 30 \times \frac{3}{\pi} = 720$ erg

39. Ans (4)

$h = \frac{2T\cos\theta}{\rho g}\left(\frac{1}{r_1} - \frac{1}{r_2}\right)$

$= \frac{2 \times 70 \times 1}{1 \times 980}\left[\frac{1}{0.1} - \frac{1}{.25}\right]$

$= 0.84$ cm

40. Ans (1)

Let the radius of bigger drop is R , smaller drop is r then

$\frac{4}{3}\pi R^3 = 8 \times \frac{4}{3} \times \pi r^3$

or $\quad R = 2r \qquad$ ...... (i)

Terminal velocity, $v \propto r^2$

$\therefore \frac{v'}{v} = \frac{R^2}{r^2} = \left(\frac{2r}{r}\right)^2 = 4$

or $\quad v' = 4v = 4 \times 8 = 32$ cm s^{-1}

41. Ans (1)

Isothermal condition $P_1V_1 = P_2V_2$

$P_1r_1^3 = P_2r_2^3$

$P_0(2r)^3 = (P_0 + x)r^3 \Rightarrow x = 7P_0$

depth of lake = x = 7 × 10 = 70 m

42. Ans (2)

$v = \sqrt{\mu Rg}$

$\%v = \frac{1}{2}(\%R)$

$\%v = \frac{1}{2}(4) = 2\%$

43. Ans (4)

Total KE = Rotational KE + Traslational KE

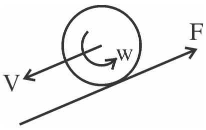
$= \frac{1}{2}I\omega^2 + \frac{1}{2}mv^2$

44. Ans (4)

$f \leq \mu mg\cos\theta$ so (a) is false

In pure rolling no loss of energy

so (g) is false



f increases w, decreases v

(c) is true

Equation of motion for sphere

$mg\sin\theta - f = ma$......(1)

torque $\tau = fR = mk2\propto$

about centre, $a = R\propto$

$FR = mk^2\frac{a}{R}$

$FR^2 = mK^2a$ ..... (2) Put in (1)

$mg\sin\theta - F = \frac{fR^2}{R^2}$

$mg\sin\theta = f\left(1 + \frac{R^2}{k^2}\right)$

$f = \frac{mg\sin\theta}{1 + R^2/K^2}$

As θ decreases, friction decreases.

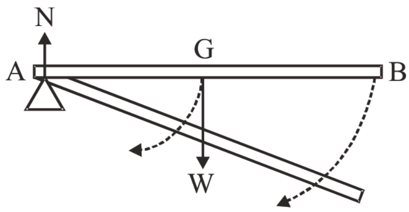
45. Ans (4)

Let us first consider linear acceleration of C.G. When the man at B withdraws his support, the bar turns about A with an angular acceleration α given by $I\alpha = W\frac{l}{2}$

As $I = \frac{ml^2}{3}$ and W = mg, hence $\alpha = \frac{3g}{2l}$

Hence linear acceleration of C.G.

$a = \frac{l}{2}\alpha = \frac{l}{2}\cdot\frac{3g}{2l} = \frac{3g}{4}$



Now if the normal reaction at A is N, then

$W - N = ma$

$N = W - ma$

$= mg - ma$

$= mg - m\left(\frac{3g}{4}\right) \Rightarrow \frac{mg}{4} = \frac{W}{4}$

46. Ans (4)

$EN \propto Z_{eff} \propto \frac{1}{\text{Radius}}$

N > C > P > Si

51. Ans (3)

NCERT Pg. # 84 ; Para 3.7.1 (a)

56. Ans (1)

Zeff ↑ Atomic size ↓

61. Ans (1)

Only (1) shows reduction of H_2O in which H_2O reduces to H_2.

64. Ans (1)

$NaNO_3 \xrightarrow{\Delta} NaNO_2 + \frac{1}{2}O_2$

70. Ans (3)

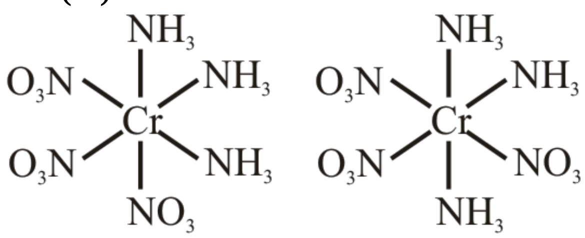
I.P. $\propto Z_{eff}$

71. Ans (3)

E.A. of inert gases = 0

IE α $\frac{\text{zeff}}{\text{size}}$

89. **Ans (2)**



92. **Ans (2)**
NCERT–XI, Pg. # 143

93. **Ans (1)**
NCERT (XIth) Pg. # 146

95. **Ans (2)**
NCERT (XI) Pg. # 144

96. **Ans (1)**
NCERT Pg # 144

101. **Ans (1)**
NCERT-XI→ Pg-147

103. **Ans (3)**
NCERT XIth Pg.#150

106. **Ans (4)**
NCERT Pg. # 162, 10.1

108. **Ans (4)**
NCERT Pg. # 163,164

111. **Ans (2)**
NCERT Pg. # 166

116. **Ans (1)**
NCERT XI, Page # 128

117. **Ans (2)**
NCERT (XIth) Pg. # 126

120. **Ans (1)**
NCERT (XI) Pg. # 132, Para–3

123. **Ans (3)**
NCERT (XI) Pg # 133(E), 133(H), fig. 8.5

126. **Ans (2)**
NCERT (XI) Pg. # 136, para-04

127. **Ans (4)**
NCERT-XI, Page # 169, (Fig. 10.3), 166 (Fig. 10.2)

129. **Ans (1)**
NCERT-XI, Pg # 138, Para- 3

133. **Ans (2)**
NCERT (XIth) Eng. Pg. # 231 (4th para)

135. **Ans (1)**
NCERT (XIth) Eng. Pg. # 237

136. **Ans (2)**
NCERT XI (E) Page 230 (topic = Fermentation 1st paragraph)

137. **Ans (3)**
NCERT (XIth) Pg. # 237

139. **Ans (3)**
NCERT-XI Eng. Pg. # 154 (1st para)

141. **Ans (1)**
NCERT (XI) Pg. # 159

144. **Ans (3)**
NCERT (XI) Eng. Pg.# 204 (2nd last para)

145. **Ans (1)**
NCERT (XIth) Eng. Pg. # 157 [Fig. 9.7 (c)]

146. **Ans (3)**
NCERT (XIth) Pg. (E) # 196
Pg. (H) # 196

147. **Ans (2)**
NCERT XI, Pg.# 194

149. **Ans (2)**
NCERT (XI) Eng. Pg.# 197 and 198

150. **Ans (3)**
NCERT Pg.#203

152. **Ans (4)**
NCERT (XI) Eng. Pg. # 199 (2nd last para)

160. **Ans (4)**
NCERT-XI, Pg. # 242, Fig. 15.4 (Eng)

166. **Ans (3)**
NCERT–XI, Pg. # 206, Para-1, Line-5

172. **Ans (2)**
NCERT (XI) Pg. # 220

177. **Ans (2)**
NCERT Pg # 187, Para-3, line-9,10

178. **Ans (2)**
NCERT-XI, Pg # 186