AVIRAL CLASSES
CREATING SCHOLARS
JEE (ADVANCED), PMT & FOUNDATIONS

UTS- NEET -2020
MOCK TEST-07 SOLUTION

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

1. $10\ \text{VSD} = 9\text{MSD}$

$$1\text{VSD} = \frac{9}{10}\text{MSD}$$

$$\text{L.C.} = 1\ \text{MSD} - 1\ \text{VSD}$$

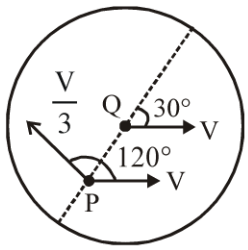
$$= 1\ \text{MSD} - \frac{9}{10}\text{MSD}$$

$$= \frac{1}{10}\text{MSD}$$

$$= \frac{1}{10}\times 10^{-3}$$

$$= 0.1\ \text{mm}$$

2.



$$V_{net} = \sqrt{(WR)^2 + \left(\frac{WR}{3}\right)^2 + 2WR\frac{WR}{3}\cos 120}$$

$$V_{net} = \sqrt{W^2R^2 + \frac{W^2R^2}{9} - \frac{W^2R^2}{3}}$$

$$= \sqrt{\frac{9W^2R^2 + W^2R^2 - 3W^2R^2}{9}} = \frac{\sqrt{7}}{3}WR$$

$$V_{net} = \frac{\sqrt{7}}{3}V$$

3. $Q = C_{eff}V$

$= \left(\frac{2C}{3}\right)\times 10 = \frac{2\times 6}{3}\times 10 \times 10^{-6} = 40\mu C$

4. $\theta = t^2 - 3t + 4$

$\Rightarrow \omega = \frac{d\theta}{dt} = (2t-3)$ $\Rightarrow a_r = \omega^2 r$

at t = 2 sec.

$a_r = 2 m/s^2$

$\Rightarrow \alpha = \frac{d\omega}{dt} = 2\ rad/s^2$

$\alpha = \frac{a_t}{R}$

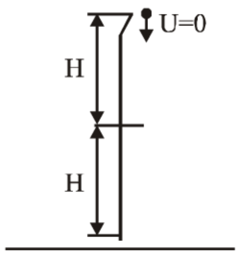
$a_t = 1 \times 2 = 2\ m/s^2$

$a_{net} = \sqrt{a_t^2 + a_r^2}$

$= \sqrt{2^2 + 1^2}$

$= \sqrt{5}\ m/s^2$

6.



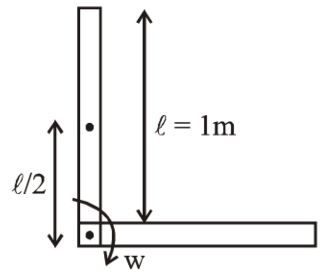
$\sqrt{\frac{2H}{g}} = 5$

$t_{req} = \sqrt{\frac{2(2H)}{g}} - \sqrt{\frac{2H}{g}}$

$\Rightarrow \sqrt{\frac{2H}{g}} \quad \left\{\sqrt{2}-1\right\}$

$\Rightarrow 5\left\{\sqrt{2}-1\right\} \approx 2sec$

7.

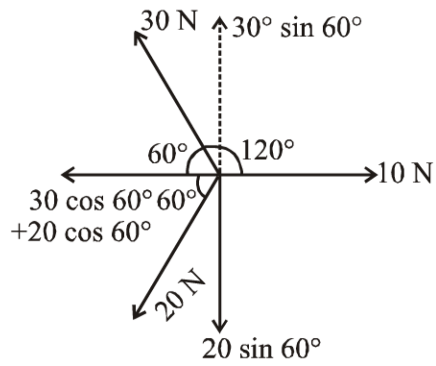


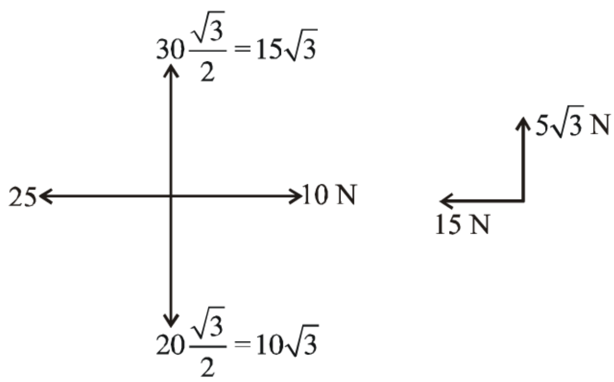
$\Rightarrow mg\frac{\ell}{2} = \frac{1}{2}I\omega^2 \Rightarrow mg\ell = 1\frac{m\ell^2}{3}\omega^2$

$\Rightarrow \omega^2 = \frac{3g}{\ell} \Rightarrow \omega = \sqrt{\frac{3g}{\ell}}$

$\omega = \sqrt{3g}$

11.

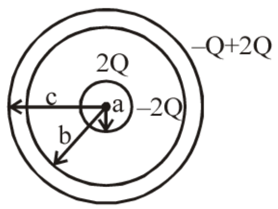




$F_{net} = \sqrt{15^2 + (5\sqrt{3})^2}$

$= \sqrt{225 + 75} = \sqrt{300}$

$= 10\sqrt{3}\ N$

12. 

Innere surface $-\frac{2Q}{4\pi b^2}$

Outer surface $\frac{Q}{4\pi c^2}$

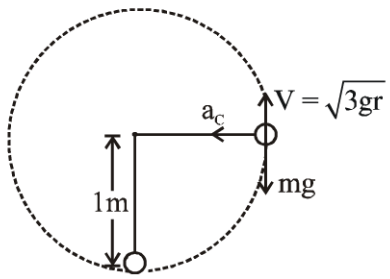
13. $T_1 = (20°C \pm 0.5°C)$
$T_2 = (40°C \pm 0.4°C)$
Temp diff. $= T_2 - T_1$
$= (20 \pm 0.9)°C$

14. $I = MR^2$

$$\frac{\Delta I}{I} \times 100 = 2\left[\frac{\Delta R}{R} \times 100\right]$$

$= 2 \times 1.5\%$
$= 3\%$

16.



$$a_c = \frac{V^2}{r} = \frac{\left(\sqrt{3gr}\right)^2}{r} = 3 \times g \qquad .....(1)$$

$$a_{net} = \sqrt{(3g)^2 + (g)^2}$$

$$= \sqrt{10}g$$

18. $\vec{r} = 10\sqrt{3}t\hat{i}\ \ (10t - t^2)\ \hat{j}$

$x = 10\ \sqrt{3}\ t$

$y = 10\ t - t^2$

$$U_x = V_x = \frac{dx}{dt} = 10\sqrt{3}\ m/s$$

$$V_y = \frac{dx}{dt} = 10 - 2t$$

Initial velocity $\boxed{t = 0}$

$$\boxed{V_y = 10 m/s}$$

$$\tan\theta = \frac{V_y}{V_x}$$

$$\tan\theta = \frac{10}{10\sqrt{3}}$$

$\theta = 30°$

angle from
Vertical $= 90° - 30°$
$= 60°$

19. Percent of its total K.E. is rotational K.E.

$$= \frac{K^2/R^2}{1 + K^2/R^2} \times 100$$

$$\frac{K^2}{R^2} = 1 = 1 \text{ [for ring]}$$

$$= \frac{1}{1+1} \times 100 = 50\%$$

20. $$n = \frac{E\lambda}{hc} = \frac{1 \times 10^{-7} \times 200 \times 10^{-9}}{6.6 \times 10^{-34} \times 3 \times 10^8} = 1 \times 10^{11}$$

number of electrons ejected $= \frac{10^{11}}{10^3} = 10^8$

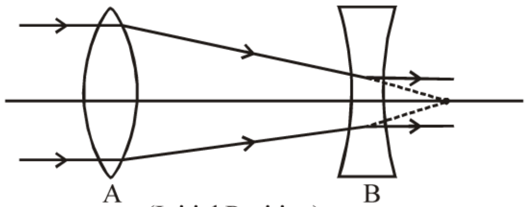
$$\therefore V = \frac{q}{4\pi\varepsilon_0 r} = \frac{(10^8 \times 1.6 \times 10^{-19}) \times 9 \times 10^9}{4.8 \times 10^{-2}} = 3V$$

22. $$\left[J = \frac{I}{A}\right] \Rightarrow J \alpha \frac{I}{A}$$

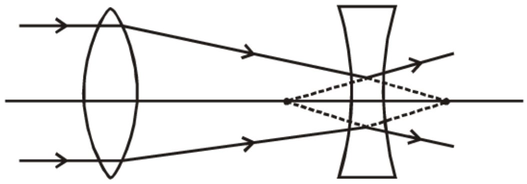
23. Magnitude of unit
Vector = I
$\Rightarrow 0.4^2 + 0.6^2 + \alpha^2 = 1$
$\Rightarrow 0.16 + 0.36 + \alpha^2 = 1$
$\alpha^2 = 1 - 0.52$
$\alpha^2 = 0.48$

$$\boxed{\alpha = \sqrt{0.48}}$$

24. Initially, the object for lens B (the image formed by lens A) is at its focus, so rays are parallel. As the separation b/w A and B decreases, the object for B is lying away from focus and hence, the rays get diverged.



(Initial Position)



(Later Position)

25. de-Broglie wavelength $\lambda = \frac{h}{mv_{rms}}$

rms velocity of a gas particle at the given temperature (T) is gives as

$$\frac{1}{2}mv_{rms}^2 = \frac{3}{2}kT \Rightarrow v_{rms} = \sqrt{\frac{3kT}{m}} \Rightarrow mv_{rms} = \sqrt{3mkT}$$

$$\therefore \lambda = \frac{h}{mv_{rms}} = \frac{h}{\sqrt{3mkT}}$$

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

26. $V = \beta x^{3/2}$

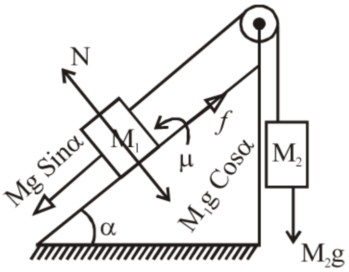
acc. to work anergy theorem

$W_{all} = \Delta KE$

$$= \frac{1}{2}MV_2^2 - \frac{1}{2}MV_1^2$$

27. $J = \frac{4.2}{3\times10^{-6}} = 1.4 \times 10^6$ amp/m^2

28.



M_1 moves downward

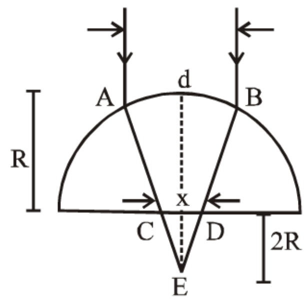
$M_1 g \sin\alpha > \mu M_1 g \cos\alpha + M_2 g$

$M_1 \sin\alpha > \mu M_1 \cos\alpha + M_2$

29. $\mu_1 = 1,\ \mu_2 = \frac{3}{2}$

$$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R} \Rightarrow \frac{3}{2v} - \frac{1}{-\infty} = \frac{3/2 - 1}{R}$$

$v = 3R$



ΔABE & ΔCDE are similer

$$\frac{d}{3R} = \frac{x}{2R} \Rightarrow x = \frac{2}{3}d$$

30. $\frac{N}{N_0} = \left(\frac{1}{2}\right)^n \Rightarrow \frac{1}{64} = \left(\frac{1}{2}\right)^6 = \left(\frac{1}{2}\right)^n \Rightarrow n = 6$

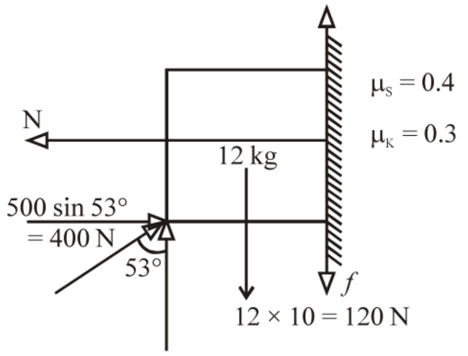
After 6 half lives intensity emitted will be safe

$\therefore$ Total time taken = 6 × 2 = 12hrs.

32. $V = \frac{E}{B} \Rightarrow E = 5 \times 10^6 \times 0.02$ V/m

$= 10^5$ V/m

33.



f = 500 N $\quad 500 \cos 53° = 500 \times \frac{3}{5} = 300$ N

$F_L = \mu_s N = 0.4 \times 400$

= 160 N

$F_K = \mu_K N = 0.3 \times 400$

$f_K = 120$ N

$12\ a = 300 - (f_K + 120)$

$12\ a = 300 - [240]$

$12\ a = 60$

$\boxed{a = 5 m/s^2}$

34. $\delta_{min} = (\mu - 1)\ A$

$\mu\uparrow \qquad \delta min\uparrow$

$$\mu = \frac{\text{Sin}\left(\frac{dm + A}{2}\right)}{\text{Sin}\left(\frac{A}{2}\right)}$$

35. $\alpha = 0.96, \qquad I_e = 7.2$ mA

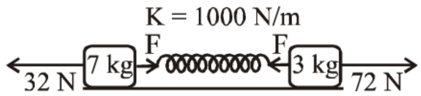
$$\alpha = \frac{I_c}{I_e}$$

or $\qquad I_c = \alpha I_e = 0.96 \times 7.2 = 6.91$ mA

we also know that $\qquad I_e = I_c + I_b$

$\therefore \qquad I_b = I_e - I_c = 7.2 - 6.91 = 0.29$ mA

36.



$$a = \frac{72 - 32}{7 + 3} = \frac{40}{10}$$

$a = 4\ m/s^2$

$72 - f = 3 \times 4$

$f - 32 = 7 \times 4$

$72 - f = 12$

$f = 60 = kx$

$60 = 1000 \times x$

x = 6 cm

38. $\frac{dk}{dt} = P$

$\Rightarrow \int dK = \int P dt$

$\Rightarrow \Delta K = \int_0^3 (3t^2 + 2t + 6) dt$

$= \left[\frac{3t^3}{3} + \frac{t^2}{2} + 6t\right]_0^3$

$\Delta K = [3^3 + 3^2 + 6 \times 3]$

$= [27 + 9 + 18]$

= 54 J

39. The distance of a bright fringe from zero order fringe is given by

$$x_n = \frac{n\lambda D}{2d}$$

Thus at a given point n λ = constant

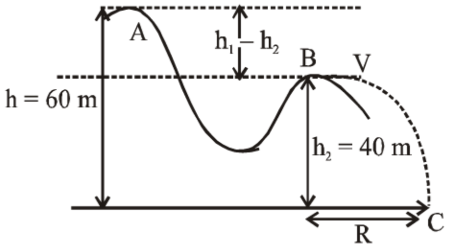
$\therefore \qquad n_1\lambda_1 = n_2\lambda_2$

$$n_2 = \frac{n_1\lambda_1}{\lambda_2} = \frac{16 \times 7200}{4800} = 24$$

42. $r = \frac{\sqrt{2MKE}}{qB}$

$$KEp = \left(\frac{Md}{M_p}\right)\left(\frac{q_P}{q_d}\right)^2 \times (RE)_d = \left(\frac{2}{1}\right) \times 50\ \text{Kev} = 100\ \text{keV}$$

43.



$\Rightarrow mg\,(h_1 - h_2) = \frac{1}{2}mV^2$

$10\,(60 - 40) = \frac{V^2}{2}$

$\Rightarrow 10 \times 20 \times 2 = V^2$

$V^2 = 400$

$V = 20$ m/s

$R = V\sqrt{\frac{2h_2}{g}} = 20\sqrt{\frac{2\times 40}{10}}$

$\Rightarrow 20\sqrt{8} = 40\sqrt{2}$ m

44. Linear width of principal maximum

$$= \frac{2\lambda}{d} \times D$$

According to the given problem

$$\left. d = \frac{2\lambda}{d} \times D \;\text{ or }\; D = \frac{d^2}{2\lambda} \right]$$

46. $C_3H_8 + 5\,O_2 \longrightarrow 3\,CO_2 + 4\,H_2O$

1 mol 3 mol 4 mol

amount of $CO_2 = \frac{5}{44} \times 3 \times 44 \times 0.8 = 12$g

amount of $H_2O = \frac{5}{44} \times 4 \times 18 \times 0.8 = 6.54$ g

47. $\underset{+7}{KMnO_4} + \underset{+1\;-2}{Cu_2S} \longrightarrow \overset{+2}{\underset{+2}{Cu}} + \underset{+4}{SO_2} + \overset{+2}{\underset{+2}{Mn}}$

total change in O.N. in Cu_2S

$1.5 \times 8 = x_{KMnO_4} \times 5$; x = 2.4 moles

66. Work done (ω) = $-P\Delta V$

$= -1 \times 10$

$= -10$ atm dm^3

76. $A + B \rightleftharpoons C + D$

	A	B	C	D
t = 0	1	1	0	0
At eq^m	1–x	1–x	x	x

given = x = 2 (1 – x)

3x = 2

x = 2/3

$$K_C = \frac{\frac{2}{3} \times \frac{2}{3}}{\frac{1}{3} \times \frac{1}{3}} = 4$$

81. $[Ag^+]$ obtained from $Ag_2CrO_4 = \sqrt[3]{\frac{Ksp}{4}}$

86. $M = \dfrac{\dfrac{n \times 1000}{1000 + n \times m_\omega}}{d} = \dfrac{\dfrac{5 \times 1000}{1000 + 5 \times 40}}{1.2}$