

JEE MAIN 2024

SESSION-2

Paper with Solution

PHYSICS | 08th April 2024 _ Shift-2



MOTION

PRE-ENGINEERING
JEE (Main+Advanced)

PRE-MEDICAL
NEET

FOUNDATION (Class 6th to 10th)
Olympiads/Boards

CORPORATE OFFICE

"Motion Education" 394, Rajeev Gandhi Nagar, Kota 324005 (Raj.)
Toll Free : 18002121799 | www.motion.ac.in | Mail : info@motion.ac.in

MOTION
LEARNING APP



Scan Code
for Demo Class

SECTION – A

31. A thin circular disc of mass M and radius R is rotating in a horizontal plane about an axis passing through its centre and perpendicular to its plane with angular velocity ω . If another disc of same dimensions but of mass $\frac{M}{2}$ is placed gently on the first disc co-axially, then the new angular velocity of the system is:

- (1) $\frac{4}{5}\omega$ (2) $\frac{2}{3}\omega$ (3) $\frac{5}{4}\omega$ (4) $\frac{3}{2}\omega$

Sol. 2

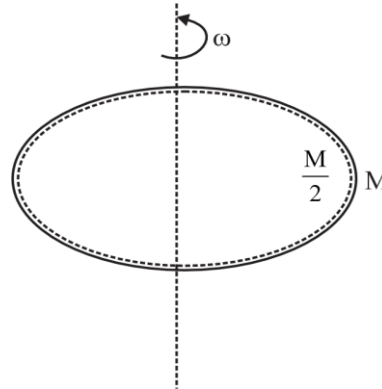
Using angular momentum conservation

$$L_i = L_f$$

$$\frac{MR^2}{2}\omega = \left(\frac{MR^2}{2} + \frac{M/2 R^2}{2} \right) \omega'$$

$$\frac{MR^2}{2}\omega = \frac{3MR^2}{4}\omega'$$

$$\omega' = \frac{2\omega}{3}$$



32. Water boils in an electric kettle in 20 minutes after being switched on. Using the same main supply, the length of the heating element should be _____ to _____ times of its initial length if the water is to be boiled in 15 minutes.

- (1) increased, $\frac{4}{3}$ (2) increased, $\frac{3}{4}$ (3) decreased, $\frac{3}{4}$ (4) decreased, $\frac{4}{3}$

Sol. 3

$$P = \frac{V^2}{R}, R = \rho \times \frac{L}{A}$$

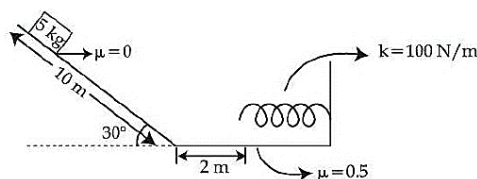
$$P \propto \frac{1}{L}$$

$$P_1 \times t_1 = P_2 \times t_2$$

$$\frac{P_1}{P_2} = \frac{t_2}{t_1} = \frac{L_2}{L_1} = \frac{15}{20}$$

$$L_2 = \frac{3}{4}L_1$$

33. A block is simply released from the top of an inclined plane as shown in the figure above. The maximum compression in the spring when the block hits the spring is :



- (1) 1 m (2) $\sqrt{6}m$ (3) $\sqrt{5}m$ (4) 2 m

Sol. 4

$$\sin 30 = \frac{h}{10}$$

$$h = 5$$

using WET

at max^m compression $v = 0$

$$W_{\text{all}} = \Delta KE$$

$$W_{\text{org}} + W_{\text{friction}} + W_{\text{ext}} = 0$$

$$mgh + \frac{1}{2}kx^2 - fq(2+x) = 0$$

$$5 \times 10 \times 5 + \frac{1}{2} \times 100 \times x^2 - \left[\frac{1}{2} \times 5 \times 10(2+x) \right] = 0$$

$$250 + 50x^2 - [50 + 25x] = 0$$

$$250 + 50x^2 - 50 - 25x = 0$$

$$8x + 2x^2 - x = 0$$

$$2x^2 - x + 8 = 0$$

$$x = 2$$

34. The angle of projection for a projectile to have same horizontal range and maximum height is :

- (1) $\tan^{-1}(2)$ (2) $\tan^{-1}\left(\frac{1}{2}\right)$ (3) $\tan^{-1}(4)$ (4) $\tan^{-1}\left(\frac{1}{4}\right)$

Sol. 3

$$H_{\text{max}} = \text{Range}$$

$$\frac{u^2 \sin 2\theta}{g} = \frac{u^2 \sin^2 \theta}{2g}$$

$$4 \sin\theta \cos\theta = \sin^2\theta$$

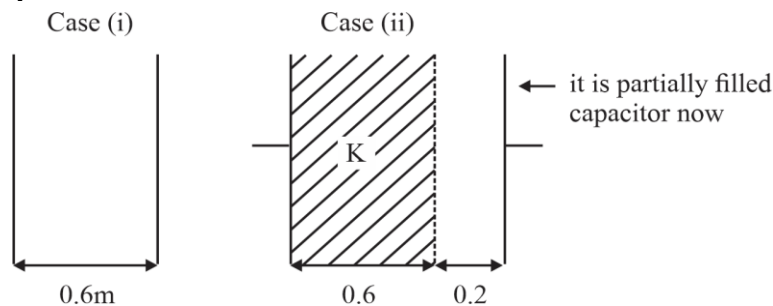
$$\tan\theta = 4$$

$$\theta = \tan^{-1}(4)$$

35. A capacitor has air as dielectric medium and two conducting plates of area 12 cm^2 and they are 0.6 cm apart. When a slab of dielectric having area 12 cm^2 and 0.6 cm thickness is inserted between the plates, one of the conducting plates has to be moved by 0.2 cm to keep the capacitance same as in previous case. The dielectric constant of the slab is : (Given $\epsilon_0 = 8.834 \times 10^{-12} \text{ F/m}$)

- (1) 1 (2) 0.66 (3) 1.33 (4) 1.50

Sol. 4



Expression for parallel plate capacitance

$$C = \frac{\epsilon_0 A}{d}$$

For partially filled capacity

$$C = \frac{\epsilon_0 A}{d - t + t/k}$$

in both the cases value of d is different
for case (i)

$$C_1 = \frac{\epsilon_0 A}{0.6}$$

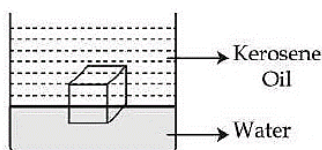
$$\text{for case (ii) } C_2 = \frac{\epsilon_0 A}{0.8 - 0.6 + \frac{0.6}{K}}$$

Now $C_1 = C_2$

$$\frac{\epsilon_0 A}{0.6} = \frac{\epsilon_0 A}{0.2 + \frac{0.6}{K}}$$

$$0.6 = 0.2 + \frac{0.6}{K} \Rightarrow K = \frac{3}{2}$$

36. A cube of ice floats partly in water and partly in kerosene oil. The ratio of volume of ice immersed in water to that in kerosene oil (specific gravity of Kerosene oil = 0.8, specific gravity of ice = 0.9):



- (1) 5 : 4 (2) 9 : 10 (3) 1 : 1 (4) 8 : 9

Sol. 3

Buoyancy force balance weight at equilibrium : -

$$F_{B_1} + F_{B_2} = mg$$

$$\text{We know specific gravity} = \frac{\rho_{\text{substance}}}{\rho_{\text{H}_2\text{O}}} \left\{ \begin{array}{l} \rho_{\text{kerosene}} = 0.8 \rho_w \\ \rho_{\text{ice}} = 0.9 \rho_w \end{array} \right.$$

$$\rho_k g v_1 + \rho_w g v_2 = \rho_{\text{ice}} (v_1 + v_2) g$$

$$\rho_k v_1 + \rho_w v_2 = \rho_{\text{ice}} (v_1 + v_2)$$

$$0.8 \rho_w v_1 + \rho_w v_2 = 0.9 \rho_w v_1 + 0.9 \rho_w v_2$$

$$v_2 - 0.9 v_2 = 0.9 v_1 - 0.8 v_1$$

$$0.1 v_2 = 0.1 v_1$$

$$v_2 = v_1$$

So ratio $\Rightarrow 1:1$

37. If M_o is the mass of isotope ${}^{12}_5\text{B}$, M_p and M_n are the masses of proton and neutron, then nuclear binding energy of isotope is :

(1) $(M_o - 5M_p - 7M_n)C^2$

(2) $(M_o - 12M_n)C^2$

(3) $(M_o - 5M_p)C^2$

(4) $(5M_p + 7M_n - M_o)C^2$

Sol. 4



$$(5 m_p + 7 m_n - m_o)C^2 = BE$$

38. If ϵ_0 is the permittivity of free space and E is the electric field, then $\epsilon_0 E^2$ has the dimensions :

(1) $[M^0 L^{-2} T A]$

(2) $[M L^{-1} T^{-2}]$

(3) $[M^{-1} L^{-3} T^4 A^2]$

(4) $[M L^2 T^{-2}]$

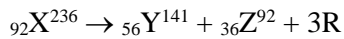
Sol. 2

$$\text{Energy per unit volume} = \frac{1}{2} \epsilon_0 E^2$$

$$\frac{J}{m^3} = \frac{1}{2} \epsilon_0 E^2$$

$$[ML^{-1} T^{-2}] = \epsilon_0 E^2$$

39. In a hypothetical fission reaction



The identity of emitted particles (R) is :

- (1) γ -radiations (2) Electron (3) Neutron (4) Proton

Sol. 3

$$Z \text{ in LHS} = 92, Z \text{ in RHS} = 56 + 36 = 92$$

$$A \text{ in LHS} = 236$$

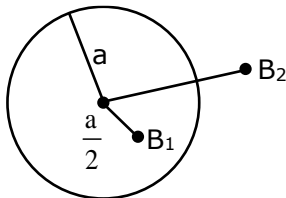
$$A \text{ in RHS} = 141 + 92 = 233$$

So 3 neutrons are released

40. A long straight wire of radius a carries a steady current I . The current is uniformly distributed across its cross section. The ratio of the magnetic field at $\frac{a}{2}$ and $2a$ from axis of the wire is :

- (1) 1 : 1 (2) 3 : 4 (3) 1 : 4 (4) 4 : 1

Sol. 1



Magnetic field inside wire

$$B_{\text{inside}} = \frac{\mu_0 J r}{2} = \frac{\mu_0 I r}{2A} = \frac{\mu_0 I r}{2\pi a^2}$$

$$r \rightarrow a/2$$

$$B_{\text{inside}} = \frac{\mu_0 I}{4\pi a}$$

$$\text{Magnetic field outside } (B_2) = \frac{\mu_0 i}{2\pi r}$$

$$= \frac{\mu_0 i}{2\pi(2a)}$$

$$= \frac{\mu_0 i}{4\pi a}$$

$$B_{\text{inside}} = \frac{\mu_0 I}{4\pi a}$$

$$\text{So } B_1 = B_2 \Rightarrow 1 : 1$$

41. Least count of a vernier caliper is $\frac{1}{20N}$ cm. The value of one division on the main scale is 1 mm. Then the number of divisions of main scale that coincide with N divisions of vernier scale is :

(1) $\left(\frac{2N-1}{2N}\right)$ (2) $(2N-1)$ (3) $\left(\frac{2N-1}{2}\right)$ (4) $\left(\frac{2N-1}{20N}\right)$

Sol. 3

(i) $LC = 1MSD - 1VSD$

$$\frac{1}{20N} \times 10 \text{ mm} = 1 \text{ mm} - 1VSD$$

$$1VSD = \left(1 - \frac{1}{2N}\right) \text{ mm} = \left(\frac{2N-1}{2N}\right) \text{ mm}$$

(ii) $N(VSD) = x \text{ MSD}$

$$N\left(\frac{2N-1}{2N}\right) \text{ mm} = x(1 \text{ mm})$$

$$x = \frac{2N-1}{2}$$

42. A diatomic gas ($\gamma = 1.4$) does 100 J of work in an isobaric expansion. The heat given to the gas is :
 (1) 150 J (2) 250 J (3) 490 J (4) 350 J

Sol. 4

Isobaric, diatomic, work done = 100J

$$\Delta Q = nC_p \Delta T$$

$$= n\left(\frac{7R}{2}\right) \Delta T \left(\begin{array}{l} pv = nRT \\ p\Delta y = nr\Delta T = \text{work done} \end{array} \right)$$

$$\Delta Q = \frac{7}{2} nR\Delta T$$

$$\Delta Q = \frac{7}{2} \text{ work done}$$

$$\Delta Q = \frac{7}{2} \times 100$$

$$\Delta Q = \frac{700}{2}$$

$$\Delta Q = 350 \text{ J}$$

Heat we need to give to the gas.

43. A given object takes n times the time to slide down 45° rough inclined plane as it takes the time to slide down an identical perfectly smooth 45° inclined plane. The coefficient of kinetic friction between the object and the surface of inclined plane is:

(1) $\sqrt{1-n^2}$ (2) $\sqrt{1-\frac{1}{n^2}}$ (3) $1-n^2$ (4) $1-\frac{1}{n^2}$

Sol. 4

$$t_1 = nt_2 \text{ -----(1)}$$

$$S_1 = 0 + \frac{1}{2} a_1 t_1^2$$

lets find a_1

$$mg \sin\theta - \mu mg \cos\theta = ma_1$$

$$a_1 = g \sin\theta - \mu g \cos\theta$$

$$\text{Have } S_2 = 0 + \frac{1}{2} a_2 t_2^2$$

Now no friction so

$$a_2 = g \sin\theta$$

given that $S_1 = S_2$

$$\frac{1}{2} a_1 t_1^2 = \frac{1}{2} a_2 t_2^2$$

$$\left(\frac{t_1}{t_2}\right)^2 = \frac{a_2}{a_1}$$

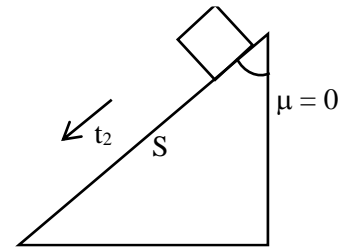
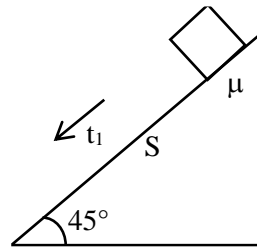
$$n^2 = \frac{g \sin\theta}{g \sin\theta - \mu g \cos\theta}$$

$$n^2 = \frac{1}{1 - \mu \times 1}$$

[$\because \theta = 45$ given]

$$n^2 = \frac{1}{1 - \mu}$$

$$1 - \mu = \frac{1}{n^2} \Rightarrow \mu = 1 - \frac{1}{n^2}$$



44. A coil of negligible resistance is connected in series with 90Ω resistor across 120 V , 60 Hz supply. A voltmeter reads 36 V across resistance. Inductance of the coil is :

- (1) 0.76 H (2) 0.286 H (3) 2.86 H (4) 0.91 H

Sol. 1

$$36 = I_{\text{rms}} R$$

$$36 = \frac{120}{\sqrt{x_L^2 + R^2}} \times R$$

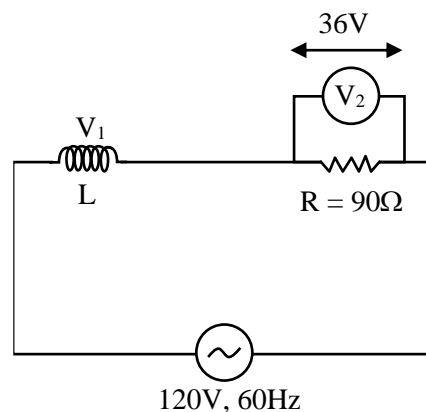
$$R = 90 \Omega \Rightarrow 36 = \frac{120 \times 90}{\sqrt{x_L^2 + 90^2}}$$

$$x_L = 286.18$$

$$\omega L = 286.18$$

$$L = \frac{286.18}{376.8}$$

$$= 0.76 \text{ H}$$



45. There are 100 divisions on the circular scale of a screw gauge of pitch 1 mm. With no measuring quantity in between the jaws, the zero of the circular scale lies 5 divisions below the reference line. The diameter of a wire is then measured using this screw gauge. It is found that 4 linear scale divisions are clearly visible while 60 divisions on circular scale coincide with the reference line. The diameter of the wire is :
- (1) 4.60 mm (2) 3.35 mm (3) 4.65 mm (4) 4.55 mm

Sol. 4

$$P = 1 \text{ mm}, N = 100$$

$$\text{least count } C = \frac{P}{N} = \frac{1\text{mm}}{100}$$

$$C = 0.01 \text{ mm}$$

The instrument has a positive zero error

$$e = NC = 5 \times 0.01$$

$$= 0.05 \text{ mm}$$

$$\text{Main scale reading is } 4 \times (\text{mm}) = 4\text{mm}$$

$$\text{Circular scale reading is } 60 \times 0.01 = 0.6 \text{ mm}$$

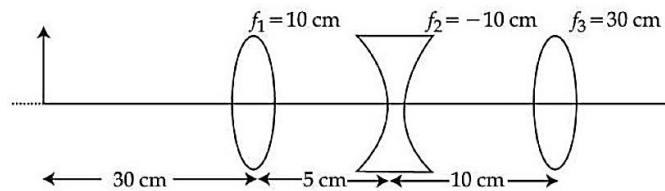
$$\text{Observed reading is } R_o = 4 + 0.6 \\ = 4.6 \text{ mm}$$

$$\text{So True reading} = R_o - e$$

$$= 4.6 - 0.05$$

$$= 4.55 \text{ mm}$$

46. The position of the image formed by the combination of lenses is:



- (1) 30 cm (left of third lens) (2) 15 cm (right of second lens)
 (3) 15 cm (left of second lens) (4) 30 cm (right of third lens)

Sol. 4

Here we will use lens formula three times, for lens 1

$$u = -30, f = 10$$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{v_1} - \frac{1}{-30} = \frac{1}{10} \Rightarrow v_1 = 15\text{cm}$$

$$\text{For 2}^{\text{nd}} \text{ lens } u = 10, f = -10$$

$$v_2 \rightarrow \infty$$

$$u_3 \rightarrow -\infty$$

$$v_3 \rightarrow +30 \text{ cm}$$

47. A proton and an electron have the same de Broglie wavelength. If K_p and K_e be the kinetic energies of proton and electron respectively, then choose the correct relation :

- (1) $K_p = K_e^2$ (2) $K_p = K_e$ (3) $K_p > K_e$ (4) $K_p < K_e$

Sol. 4

Wave length of e^- and proton are same

$$KE = \frac{P^2}{2m}$$

$$KE \propto \frac{1}{m}$$

$$\frac{KE_e}{KE_p} = \frac{M_p}{M_e}$$

48. A plane progressive wave is given by $y = 2\cos 2\pi(330t - x)$ m. The frequency of the wave is :

- (1) 340 Hz (2) 165 Hz (3) 330 Hz (4) 660 Hz

Sol. 3

$$y = 2\cos 2\pi (330 t - x)m$$

$$\omega = 330 \times 2\pi$$

$$\omega = 660\pi$$

we know \Rightarrow

$$\omega = 2\pi f$$

$$f = \frac{\omega}{2\pi}$$

$$f = \frac{660\pi}{2\pi}$$

$$f = 330 \text{ Hz}$$

49. Two satellite A and B go round a planet in circular orbits having radii $4R$ and R respectively. If the speed of A is $3v$, the speed of B will be:

- (1) $6v$ (2) $12v$ (3) $\frac{4}{3}v$ (4) $3v$

Sol. 1

$$V_o = \sqrt{\frac{GM}{4R}} = 3v$$

$$\Rightarrow \frac{1}{2} \sqrt{\frac{GM}{R}} = 3v$$

$$= \sqrt{\frac{GM}{R}} = 6v \quad \text{----- (1)}$$

Now Asked for

$$V_o^1 = \sqrt{\frac{GM}{R}}$$

Form (1)

$$V_o^1 = 6V$$

50. Given below are two statements :

Statement (I): The mean free path of gas molecules is inversely proportional to square of molecular diameter.

Statement (II): Average kinetic energy of gas molecules is directly proportional to absolute temperature of gas.

In the light of the above statements, choose the correct answer from the options given below :

- (1) **Statement I** is false but **Statement II** is true
- (2) Both **Statement I** and **Statement II** are true
- (3) **Statement I** is true but **Statement II** is false
- (4) Both **Statement I** and **Statement II** are false

Sol. 2

State – 1 : Mean free path $\lambda = \frac{1}{\sqrt{2}\pi d^2 n}$

using $d = 2r$

$$\lambda = \frac{1}{4\sqrt{2}\pi r^2 n}$$

$$\lambda \propto \frac{1}{r^2}$$

State – 2 : $E = \frac{3}{2} kT$

$$E \propto T$$

SECTION – B

51. An alternating emf $E = 110\sqrt{2} \sin 100t$ volt is applied to a capacitor of $2\mu\text{F}$, the rms value of current in the circuit is _____ mA.

Sol. 22

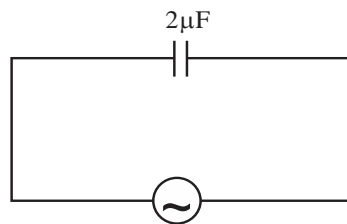
$$E_{\text{rms}} = \frac{E_0}{\sqrt{2}} = \frac{110\sqrt{2}}{\sqrt{2}}$$

$$E_{\text{rms}} = 110\text{V}$$

$$I_{\text{rms}} = \frac{E_{\text{rms}}}{X_c} = E_{\text{rms}} \cdot \omega c$$

$$= 110 \times 100 \times 2 \times 10^{-6}$$

$$= 22 \times 10^{-3} \text{ A}$$



52. The coercivity of a magnet is 5×10^3 A/m. The amount of current required to be passed in a solenoid of length 30 cm and the number of turns 150, so that the magnet gets demagnetised when inside the solenoid is _____ A.

Sol. 10

Length of solenoid (ℓ) = 30cm

No. of turns(n) = 150

$H = 5 \times 10^3$ A/m

We know $n = \frac{N}{\ell}$

$$I = \frac{N}{n}$$

$$I = \frac{5 \times 10^3 \times 0.3}{150}$$

$$I = \frac{1500}{150}$$

$$I = 10\text{A}$$

53. Small water droplets of radius 0.01 mm are formed in the upper atmosphere and falling with a terminal velocity of 10 cm/s. Due to condensation, if 8 such droplets are coalesced and formed a larger drop, the new terminal velocity will be _____ cm/s.

Sol. 40

$$V_t = \frac{2}{9m} gr^2(\rho - \sigma)$$

$$V_t \propto r^2$$

Radius double so terminal velocity 4 times

54. Two slits are 1 mm apart and the screen is located 1 m away from the slits. A light of wavelength 500 nm is used. The width of each slit to obtain 10 maxima of the double slit pattern within the central maximum of the single slit pattern is _____ $\times 10^{-4}$ m.

Sol. 2

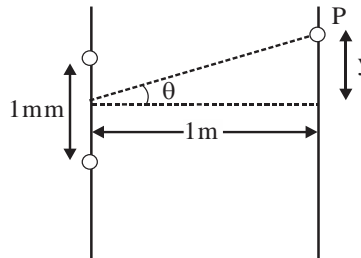
$$y = \frac{10\lambda D}{d}$$

$$\beta = \frac{D\lambda}{d}$$

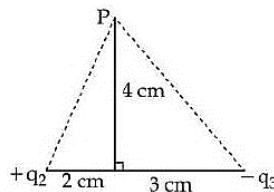
$$\frac{2\lambda D}{a} = 10 \left[\frac{\lambda D}{d} \right]$$

$$a = \frac{d}{5}$$

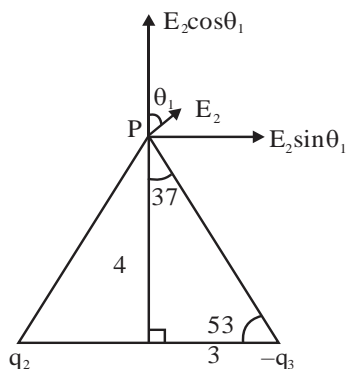
$$= \frac{10 \times 10^{-4}}{5} = 2 \times 10^{-4} \text{ m}$$



55. If the net electric field at point P along Y axis is zero, then the ratio of $\left| \frac{q_2}{q_3} \right|$ is $\frac{8}{5\sqrt{x}}$, where x = _____.



Sol. 5



$$E_2 \cos \theta_1 = \frac{kQ_2}{r^2} \cos \theta_1$$

$$= \frac{kQ_2}{20} \times \frac{4}{\sqrt{20}}$$

$$= \frac{kQ_2}{5\sqrt{20}} \quad \dots(1)$$

$$\Rightarrow E_3 \cos 37$$

$$= \frac{kQ_3}{r^2} \cos 37$$

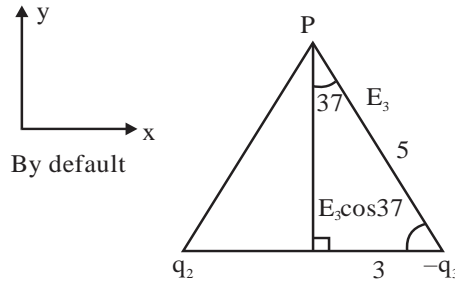
$$= \frac{kQ_3}{25} \times \frac{4}{5}$$

$$= \frac{4kQ_3}{125}$$

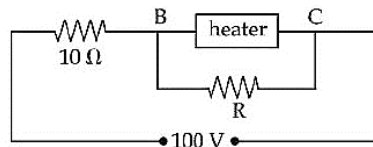
Equation (1) – (2)

$$\frac{kQ_2}{5\sqrt{20}} = \frac{4kQ_3}{125}$$

$$\frac{Q_2}{Q_3} = \frac{8}{5\sqrt{5}}$$



56. A heater is designed to operate with a power of 1000 W in a 100 V line. It is connected in combination with a resistance of 10Ω and a resistance R , to a 100V mains as shown in figure. For the heater to operate at 62.5 W, the value of R should be _____ Ω .



Sol. 5

$$P = \frac{V^2}{R}$$

$$62.5 = \frac{V^2}{10}$$

$$V = 25V$$

Rated power

$$P_0 = \frac{V_0^2}{R}$$

$$R = \frac{V_0^2}{P_0}$$

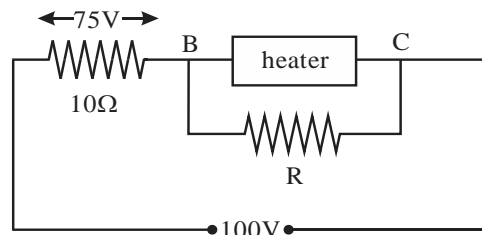
$$R = \frac{(100)^2}{1000}$$

$$R = 10\Omega$$

$$= \frac{10R}{10+R} = \frac{75}{25} \text{ (Resistance ratio = Voltage ratio)}$$

$$10 = 2R$$

$$R = 5\Omega$$



57. An object of mass 0.2 kg executes simple harmonic motion along x axis with frequency of $\left(\frac{25}{\pi}\right)$ Hz. At the position $x = 0.04$ m the object has kinetic energy 0.5 J and potential energy 0.4 J. The amplitude of oscillation is _____ cm.

Sol. 6

$$\frac{1}{2}k(0.04)^2 = 0.4$$

$$\frac{1}{2}kA^2 = 0.4 + 0.5$$

$$\left(\frac{0.04}{A}\right)^2 = \frac{4}{9}$$

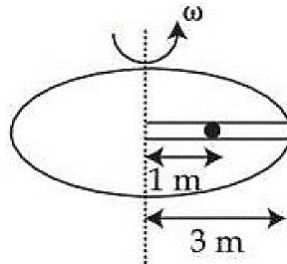
$$\left(\frac{0.04}{A}\right) = \frac{2}{3}$$

$$2A = .12$$

$$A = 0.06 \text{ m}$$

$$A = 6\text{cm}$$

58. A circular table is rotating with an angular velocity of ω rad/s about its axis (see figure). There is a smooth groove along a radial direction on the table. A steel ball is gently placed at a distance of 1 m on the groove. All the surfaces are smooth. If the radius of the table is 3 m, the radial velocity of the ball w.r.t. the table at the time ball leaves the table is $x \sqrt{2} \omega$ m/s, where the value of x is _____.



Sol. 2

at some instant of time particle is at x (location A)

$$m\omega^2x = \text{force}$$

$$\text{Now acc}^n = \frac{F}{m}$$

$$= \frac{m\omega^2x}{m}$$

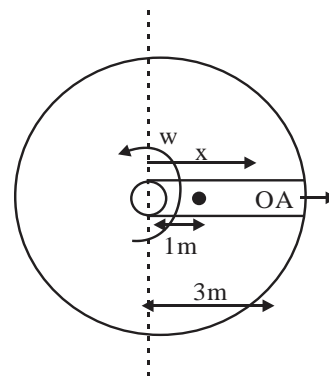
$$\omega^2x = v \frac{dx}{dx}$$

$$\omega^2 \int_1^3 x dx = \int_0^v v dx$$

$$\omega^2 \left[\frac{x^2}{2} \right]_1^3 = \left[\frac{v^2}{2} \right]_0^v$$

$$\omega^2 8 = v^2$$

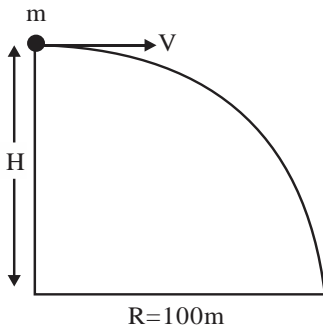
$$v = 2\sqrt{2}\omega$$



59. A body of mass M thrown horizontally with velocity v from the top of the tower of height H touches the ground at a distance of 100 m from the foot of the tower. A body of mass $2M$ thrown at a velocity $\frac{v}{2}$ from the top of the tower of height $4H$ will touch the ground at a distance of _____ m.

Sol. 100

(i)

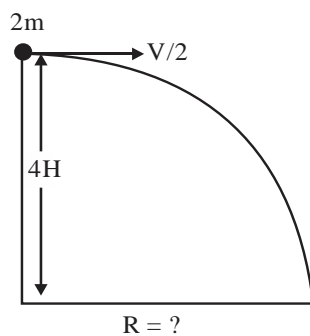


$$S_x = U_x t + 0 \quad R = 100\text{m}$$

$$100 = Vt$$

$$100 = v \sqrt{\frac{2h}{g}} \quad \dots(1)$$

(ii)



$$S_x = U_x t = 0$$

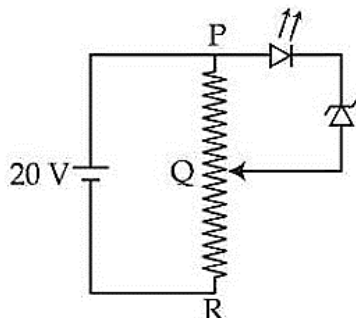
$$R = \frac{v}{2} \cdot \sqrt{\frac{2(4h)}{g}}$$

$$R = \frac{v}{2} \cdot 2 \sqrt{\frac{2h}{g}}$$

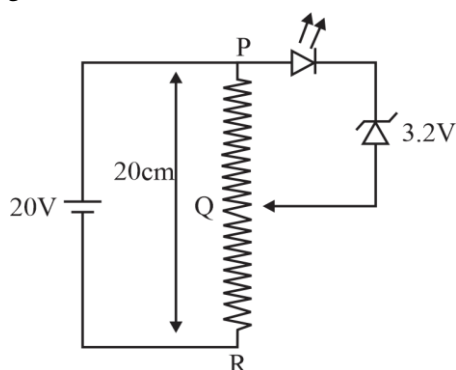
$$R = v \sqrt{\frac{2h}{g}}$$

Same as equation (1) so $R = 100$

60. A potential divider circuit is connected with a dc source of 20 V, a light emitting diode of glow in voltage 1.8 V and a zener diode of breakdown voltage of 3.2 V. The length (PR) of the resistive wire is 20 cm. The minimum length of PQ to just glow the LED is _____ cm.



Sol. 5



$$V_{PQ} = 3.2 + 1.8$$

$$V_{PQ} = 5V$$

And

$$V_{PR} = 20V(\text{given})$$

$$\text{Now } \frac{20V}{20\text{cm}} \times \ell = 5V$$

$$\ell = 5\text{cm}$$

MOTION

JEE MAIN 2024
SESSION-2

**GIVE YOUR JEE ADVANCED 2024
PREPARATION A FINAL CHECK**

Join

उत्थान

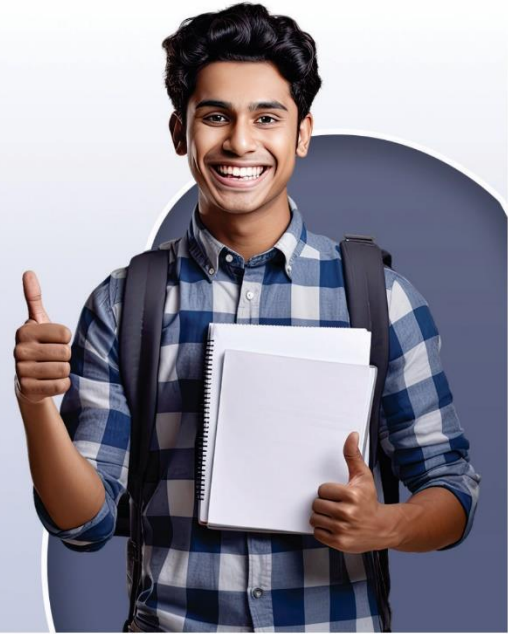
Crash Course

STARTING FROM

17th April 2024

OFFLINE
Rs. 5000

ONLINE
Rs. 2500



95%ile to 97.99%ile

Offline : 50% scholarship
Online : 100% scholarship

98%ile to 98.99%ile

Offline : 100% scholarship
Online : 100% scholarship

99%ile or ABOVE
VICTORY

BATCH

99.99%ile will be provided with free residential facilities (Hostel+Food)

Continuing to keep the pledge
of imparting education for the last 17 Years

65136+
SELECTIONS SINCE 2007

JEE (Advanced)
12142

JEE (Main)
32584

NEET/AIIMS
17875
(Under 50000 Rank)

NTSE/OLYMPIADS
2535
(6th to 10th class)

Most Promising RANKS
Produced by MOTION Faculties

Nation's Best SELECTION
Percentage (%) Ratio

NEET / AIIMS

AIR-1 to 10
25 Times

AIR-11 to 50
84 Times

AIR-51 to 100
84 Times

JEE MAIN+ADVANCED

AIR-1 to 10
8 Times

AIR-11 to 50
37 Times

AIR-51 to 100
41 Times



NITIN VIJAY (NV Sir)
Founder & CEO

**Student Qualified
in NEET**

(2023)

6492/7084 = **91.64%**

(2022)

4837/5356 = **90.31%**

**Student Qualified
in JEE ADVANCED**

(2023)

2747/5182 = **53.01%**

(2022)

1756/4818 = **36.45%**

**Student Qualified
in JEE MAIN**

(2024-First Attempt)

6495/10592 = **61.31%**

(2023)

5993/8497 = **70.53%**

(2022)

4818/6653 = **72.41%**

MOTION