

JEE-Mains-27-01-2024 [Memory Based]
[Morning Shift]

Physics

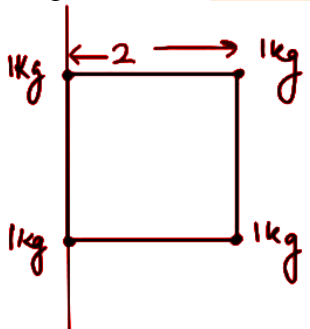
Question: Spherometer cannot measure which of the following quantities?

Options:

- (a) Radius of curvature of convex lens
- (b) Radius of curvature of concave lens
- (c) thickness of thin plates.
- (d) specific rotation of liquids

Answer: (d)

Question: Find Moment of Inertia of Massless square frame of side length 2 m with mass of 1 Kg on Each Vertex about axis passing through a side



Options:

- (a) 8 kgm^2
- (b) 2 kgm^2
- (c) 4 kgm^2
- (d) 3 kgm^2

Answer: (a)

Question: A particle is moving with initial speed $(5\hat{i} + 2\hat{j}) \frac{m}{s}$ and a constant acceleration of

$(2\hat{i} + 3\hat{j}) \frac{m}{s^2}$ starting from origin. After sometime it is observed that it has moved by a distance 84 m along the x-axis. Find the final speed

Options:

- (a) $19\hat{i} + 23\hat{j}$
- (b) $13\hat{i} + 23\hat{j}$
- (c) $19\hat{i} + 13\hat{j}$
- (d) $13\hat{i} + 13\hat{j}$

Answer: (a)

Question: A beaker is filled with two liquids each of height 6 cm if refractive indices of two liquids are $\mu_1 = 8/3$ and $\mu_2 = 5/3$ then find the apparent depth of a coin kept at the bottom of the container

Options:

- (a) 4.85 cm
- (b) 5.85 cm
- (c) 6.85 cm
- (d) 7.85 cm

Answer: (b)

Question: If radius of electron in 3rd stationary orbit is R, radius of electron in 4th stationary orbit is

Options:

- (a) $\frac{25}{9}R$
- (b) $\frac{16}{9}R$
- (c) $\frac{9}{16}R$
- (d) $\frac{9}{25}R$

Answer: (b)

Question: A particle executing SHM has amplitude $A = 4\text{m}$ and maximum speed of 10 m/s. Find its distance from mean position which its speed is 6m/s.

Options:

- (a) 3.0
- (b) 3.2
- (c) 3.4
- (d) 3.6

Answer: (b)

Question: Resistance R having length L is cut into five parts and connected in parallel. The effective resistance now is ?

Options:

- (a) R
- (b) 5R
- (c) R/5
- (d) R/25

Answer: (d)

Question: A rectangular loop of length 2.5m and breadth 2m is present in a magnetic field of 5 tesla making an angle of 60° with the plane of the loop. The loop is pulled out from the field slowly in 10 seconds. Find the EMF developed.

Options:

- (a) 2.16 volts
- (b) 1 volt
- (c) 1.16 volt
- (d) 3 volts

Answer: (a)

Question: Two parallel infinite wires are carrying current of 10 A in the opposite directions. Distance between the wires is 5 cm. Find the magnetic field at the midpoint between the wires.

Options:

- (a) 1.6×10^{-4} T
- (b) 4×10^{-4} T
- (c) 2×10^{-4} T
- (d) 6×10^{-4} T

Answer: (a)

Question: Find percentage volume change of a liquid at depth of 4000m under water as compared to on the surface. Bulk modulus of the liquid is 2×10^9 Pa.

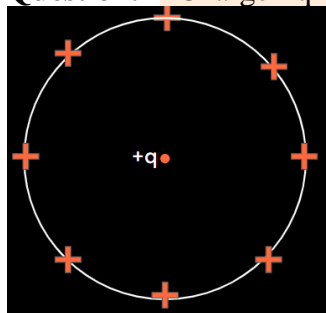
($g = 10 \text{ m/s}^2$)

Options:

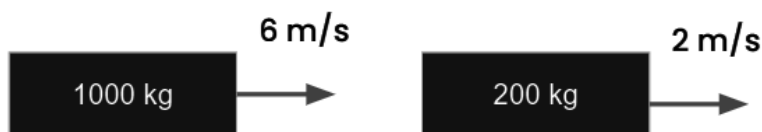
- (a) $\frac{1}{2}$ %
- (b) 2%
- (c) 1%
- (d) 0.25%

Answer: (b)

Question: If Charge +q is Kept at the centre, find the Tension in the Ring



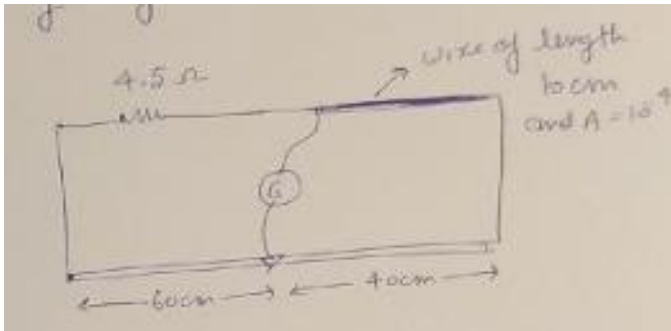
Question: After Collision Blocks stick. Find there Common Velocity



- (a) $\frac{4}{3}$ m/s
- (b) $\frac{16}{3}$ m/s
- (c) 5 m/s
- (d) $\frac{9}{5}$ m/s

Answer: (c)

Question: In a meter bridge experiment when a wire of length 10 cm and cross section area 10^{-4} m^2 is used in place of unknown resistor, then the balancing length is forced to be 60 cm. Find the resistivity of the wire

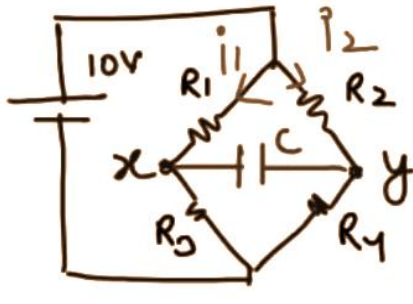


Options:

- (a) $3 \times 10^{-3} \Omega - m$
- (b) $4 \times 10^{-3} \Omega - m$
- (c) $10^{-3} \Omega - m$
- (d) $2 \times 10^{-3} \Omega - m$

Answer: (a)

Options: In the following circuit, find the charge on the positive plate of the capacitor after long time given $R_1 = 1 \Omega$, $R_2 = 6\Omega$, $R_3 = 2\Omega$, $R_4 = 4\Omega$ $C = 150 \mu F$, $V = 10V$



- (a) $200 \mu F$
- (b) $300 \mu F$
- (c) $400 \mu F$
- (d) $500 \mu F$

Answer: (c)

Question: If the displacement of a particle is given by $\vec{S} = 2t^2\hat{i} + 5\hat{j}$, then find the velocity of $t = 1$ second

Options:

- (a) $4\hat{i} + 5\hat{j}$
- (b) $2\hat{i} + 5\hat{j}$
- (c) $4\hat{i}$
- (d) $5\hat{j}$

Answer: (c)

Question: Find the intensity of an electromagnetic wave with equation its electric field component as $E = 200 \sin(1.5 \times 10^7 t - 0.05x) N/C$

- (a) 53
- (b) 67
- (c) 84
- (d) 43

Answer: (a)

Question: If a monoatomic gas molecule has a KE of 414 eV, then find the temperature of the gas if $K_B = 1.3 \times 10^{-23}$

Options:

- (a) 340 K
- (b) 3400 K
- (c) 3400 °C
- (d) 340 °C

Answer: (b)

Question: If diameter of earth's becomes half without changing its mass the value of acc due to gravity on surface become

- (a) 2g
- (b) g/2
- (c) g/4
- (d) 4g

Answer: (d)

Question: A charged particle moves in a region with constant velocity which combination of electric field and magnetic field is possible

- (i) $E \neq 0$ $B \neq 0$
- (ii) $E = 0$ $B = 0$
- (iii) $E = 0$ $B \neq 0$
- (iv) $E \neq 0$ $B = 0$

Options:

- (a) (i), (ii) and (iii) only
- (b) (i) and (ii) only
- (c) (i) and (iii) only
- (d) (ii) and (iii) only

Answer: (a)

Question: In an isothermal expansion initial pressure is $P = 800$ KPa and initial volume is 30 dm³ if the final volume is 45 dm³, find the heat absorbed in the process

[$\ln(3) = 1.099$, $\ln(2) = 0.693$]

- (a) 8790
- (b) 4350
- (c) 2088
- (d) 9731

Answer: (d)

Question: A Convex Lens of Focal length 40 cm focus a distant light on electrochemical cell and current I is produced as a results. If a convex lens of focal length 20 cm is used current will change to [assuming both lenses have same diameter]

Options:

- (a) I
- (b) $2I$
- (c) $I/2$
- (d) $I/4$

Answer: (a)

Question: A Pn S_m has a refractive index of $\mu = \cot \frac{A}{2}$. Find the minimum deviation if it is kept in air. A is angle of Prism

Options:

- (a) $\frac{\pi}{2} - \frac{A}{2}$
- (b) $\pi - 2A$
- (c) $\pi - A$
- (d) $\frac{\pi}{2} - A$

Answer: (b)

Question 23: If a charge of $1\mu\text{C}$ is placed at the origin the potential difference between points A($\sqrt{3}, \sqrt{3}$) and B($\sqrt{6}, 0$) is

Options:

- (a) $1\mu\text{J}$
- (b) $2\mu\text{J}$
- (c) $3\mu\text{J}$
- (d) 0

Answer: (d)

Question: Two particles with same KE are having masses of 4 gram and 25 gram respectively. Find the ratio of there linear momentum

Options:

- (a) 2:5
- (b) 5:2
- (c) 4:25
- (d) 25:4

Answer: (a)

Question: Read the following statements

S1: Viscosity of gases is more than liquids

S2: Addition of insoluble impurities decreases surface tension

Options:

- (a) Both are correct
- (b) Only S1 is correct
- (c) Only S2 is correct
- (d) None is correct

Answer: (c)

Question: Read the following statements

S1: Planck constants and Angular momentum have same dimension

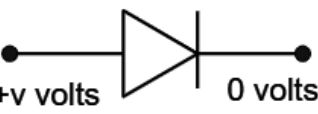
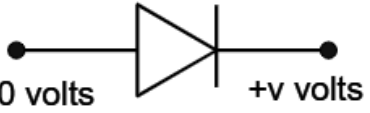
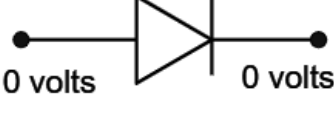
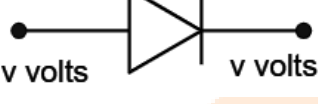
S2: Moment of the force and linear momentum have same dimension

Options:

- (a) Both are correct
- (b) Only S1 is correct
- (c) Only S2 is correct
- (d) None is correct

Answer: (b)

Question: Which of the following option shows the diode in the reverse biased mode
Options:

- (a)  +v volts 0 volts
- (b)  0 volts +v volts
- (c)  0 volts 0 volts
- (d)  v volts v volts

Answer: (b)

