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JEE MAINS 09 APRIL 2019 - PAPER 1 SHIFT 1

MEMORY BASED

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Ques No.	Question
1 - 9425996	**JEE MAINS 09 APRIL 2019 - PAPER 1 SHIFT 1 - MEMORY BASED - PHYSICS** A man can swim in still water at $4m/s$ river is flowing at $2m/s$ the angle with downstream at which he should wim to cross the river minimum drift is (A) 120° (B) 150° (C) 30° (D) 60° **CORRECT OPTION: A** Watch Free Video Solution on Doubtnut
2 - 9425997	**JEE MAINS 09 APRIL 2019 - PAPER 1 SHIFT 1 -**

MEMORY BASED - PHYSICS

An object A of mass m with initial velocity u collides with a statinary object B after elestic collision A moves with $\frac{u}{4}$ calculate mass of B.

(A) $\frac{7m}{5}$

(B) $\frac{3m}{5}$

(C) $\frac{9m}{5}$

(D) $\frac{4m}{5}$

CORRECT OPTION: B

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3 - 9425999

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A disc of mement of inertia I is rotating due to external torque. Its kinetic energy is equal to $K\theta^2$. Where K is the

positive constant. Its angular acceleration at an angle θ will be:

(A) $\frac{7K\theta}{I}$

(B) $\frac{6K\theta}{I}$

(C) $\frac{2K\theta}{I}$

(D) $\frac{4K\theta}{I}$

CORRECT OPTION: C

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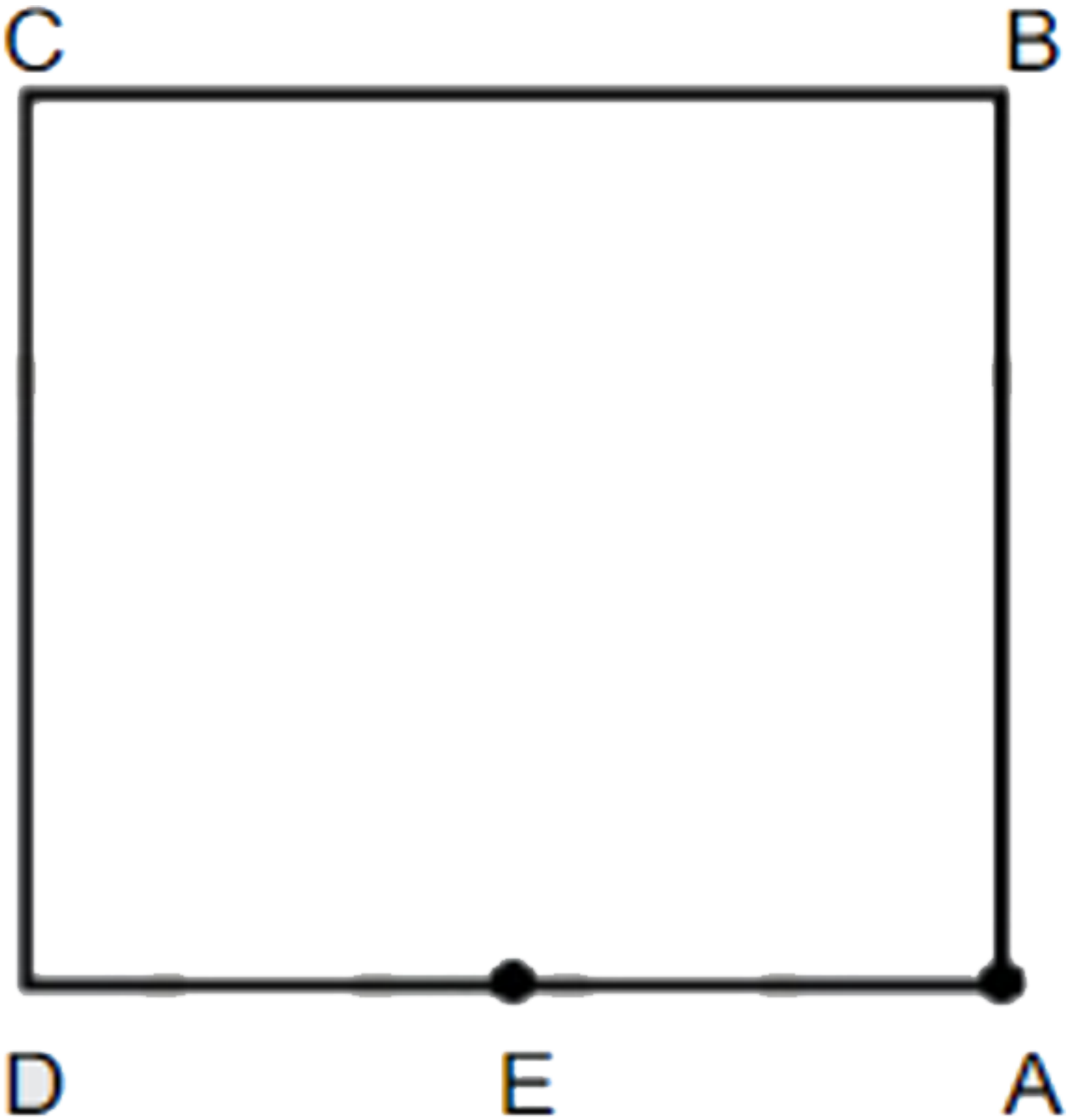

A wire of length l and resistance R is bent in form of square form of square as shown in figure. If E is a mid point of side D,A, then equivalent resistance between points E& A is:

(A) $\frac{7R}{64}$

(B) $\frac{7R}{32}$

(C) $\frac{7R}{16}$

(D) $\frac{7R}{8}$

CORRECT OPTION: A

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5 - 9426001

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In amplitude modulation equation of mesenger wave $A_o \sin \omega_m t$ and carrier wave $A_C \cos \omega_C t$ the equation of amplitude modulated wave is

(A)

$$x = A_c \cos \omega c t + \frac{A_0}{2}[\sin(\omega m + \omega c)t + \sin(\omega c - \omega m)t]$$

(B)

$$x = A_c \cos \omega ct - \frac{A_0}{2}[\sin(\omega m + \omega c)t + \sin(\omega c - \omega m)t]$$

(C)

$$x = Ac \sin \omega ct + \frac{A_0}{4}[\sin(\omega m + \omega c)t + \sin(\omega c - \omega m)t]$$

(D)

$$x = Ac \sin \omega ct + \frac{A_0}{4}[\sin(\omega m + \omega c)t + \sin(\omega c - \omega m)t]$$

CORRECT OPTION: A

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For a common emitter transistor working in active state, following data is given $R_L = 1K\Omega\ V_{\text{in}} = 10mV$

$\triangle I_B = 15\mu A,\ \triangle I_C = 3mA$. The input resistance r_i& voltage gain A_V for the transitor is

(A) $200, 0.67K\Omega$

(B) $300, 0.67K\Omega$

(C) $200, 0.1K\Omega$

(D) $300, 1K\Omega$

CORRECT OPTION: B

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A capacitor of capacitance $5\mu F$ is charged with $5\mu C$ charge its capacitance is changed to $2\mu F$ by some external agent. The work done by external agent is

(A) $40.5 \times 10^{-7} J$

(B) $42.5 \times 10^{-7} J$

(C) $37.5 \times 10^{-7} J$

(D) $30.5 \times 10^{-7} J$

CORRECT OPTION: C

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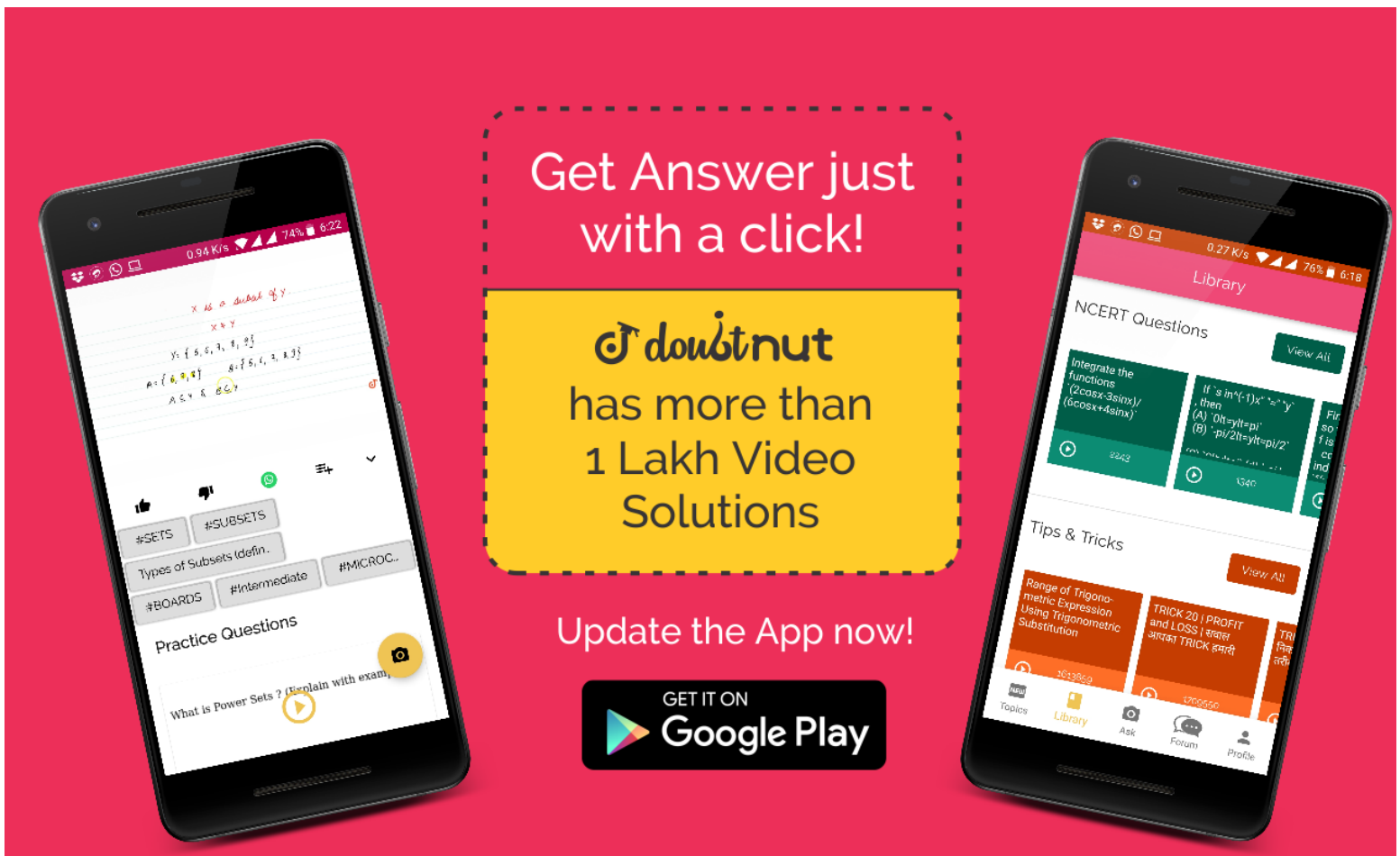

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The equation of a sound wave at $0^\circ C$ is given as $y = A\sin(1000t - 3x)$ the speed at some other temperature T is given $336m/s$ the value of T is

(A) $4.4^\circ C$

(B) $11^\circ C$

(C) $12^\circ C$

(D) $7^\circ C$

CORRECT OPTION: A

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A solid sphere of radius a and mass m is surrounded by cocentric spherical shell of thickness $2a$ and mass $2m$ the gravitational field at a distance 3a from their centres is

(A) $\frac{Gm}{a^2}$

(B) $\frac{Gm}{3a^2}$

(C) $\frac{Gm}{5a^2}$

(D) $\frac{Gm}{4a^2}$

CORRECT OPTION: B

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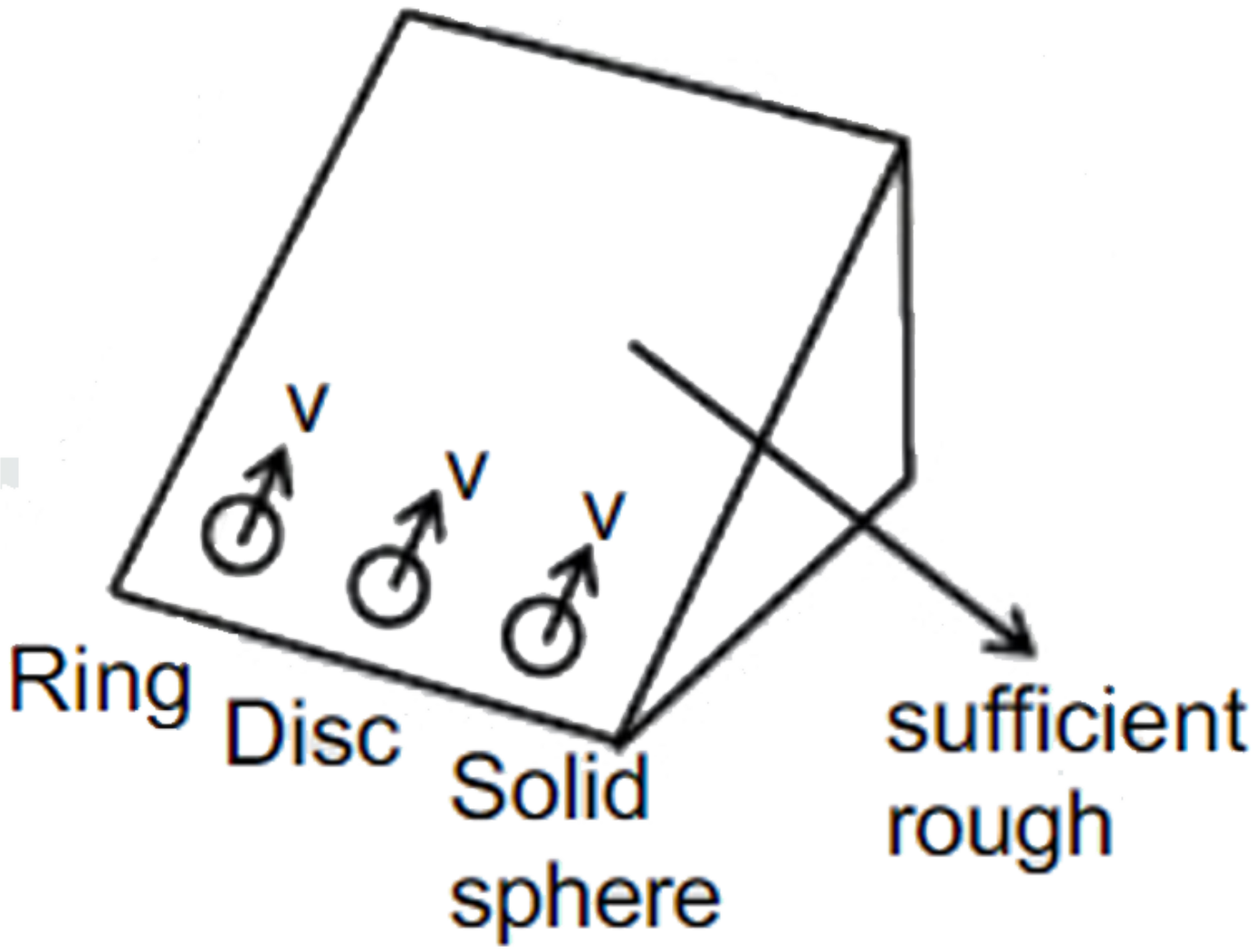

A ring disc and solid sphere are having same speed of COM at the bottom of incline as shown in the figure. If surface of incline is sufficiently rough. The ratio of height attend by ring, disc and sphere is

(A) $15:13:20$

(B) $20:15:14$

(C) $14:20:15$

(D) $7:5:15$

CORRECT OPTION: B

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Considering all type of $D.O.F$ for HCl molecule of mass m having V_{rms} as $\bar{v}$. Then the temperature of gas will be

(A) $\frac{m\bar{v}^2}{3k}$

(B) $\frac{m\bar{v}^2}{5k}$

(C) $\frac{m\bar{v}^2}{7k}$

(D) $\frac{m\bar{v}^2}{6k}$

CORRECT OPTION: A

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The time period of a simple pendulum in air is T. Now the pendulum is submerged in a liquid of density $\frac{\rho}{16}$ where ρ is density of the bob of the pendulum. The new time period of oscillation is.

(A) $\frac{4}{\sqrt{15}}T$

(B) $\sqrt{\frac{4}{15}}T$

(C) $\sqrt{\frac{15}{4}}T$

(D) $\frac{\sqrt{15}}{3}T$

CORRECT OPTION: A

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A solenoid has fixed N number of turns and fixed radius a its length is given by l which can be varied its self-inductance is proportional to

(A) l

(B) $\frac{1}{l}$

(C) l^2

(D) $\frac{1}{l^2}$

CORRECT OPTION: B

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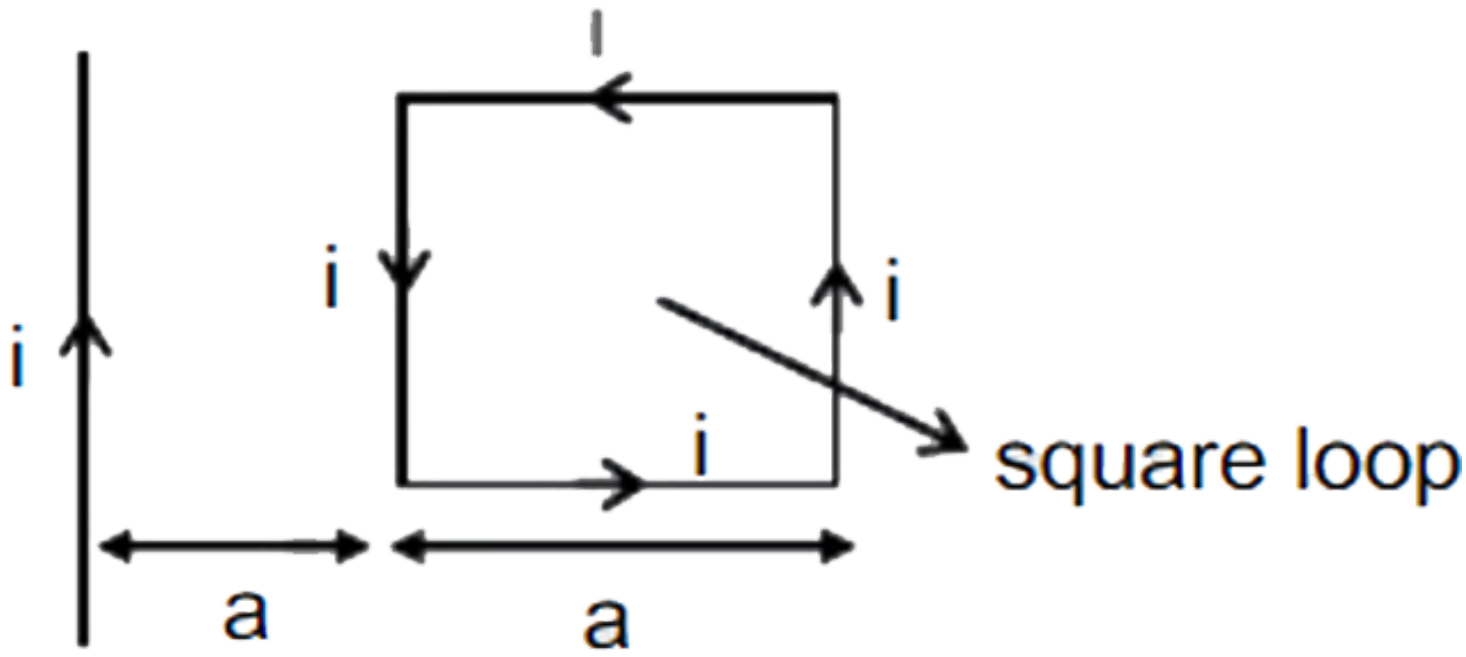

The force between the infinite wire and the square loop is

(A) $\frac{\mu_0 l^2}{4\pi}$ repulsive

(B) $\frac{\mu_0 l^2}{2\pi}$ repulsive

(C) $\frac{\mu_0 l^2}{4\pi}$ attractive

(D) $\frac{\mu_0 l^2}{2\pi}$ attractive.

CORRECT OPTION: A

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A uniform chain of mass m & length L is kept on a smooth horizontal table such that $\frac{L}{n}$ portion of the chaing hangs from the table. The work dione required to slowly bringsthe chain completely on the table is

(A) $\frac{mgL}{n}$

(B) $\frac{mgL}{2}$

(C) $\frac{mgL}{n^2}$

(D) $\frac{mgL}{2n^2}$

CORRECT OPTION: D

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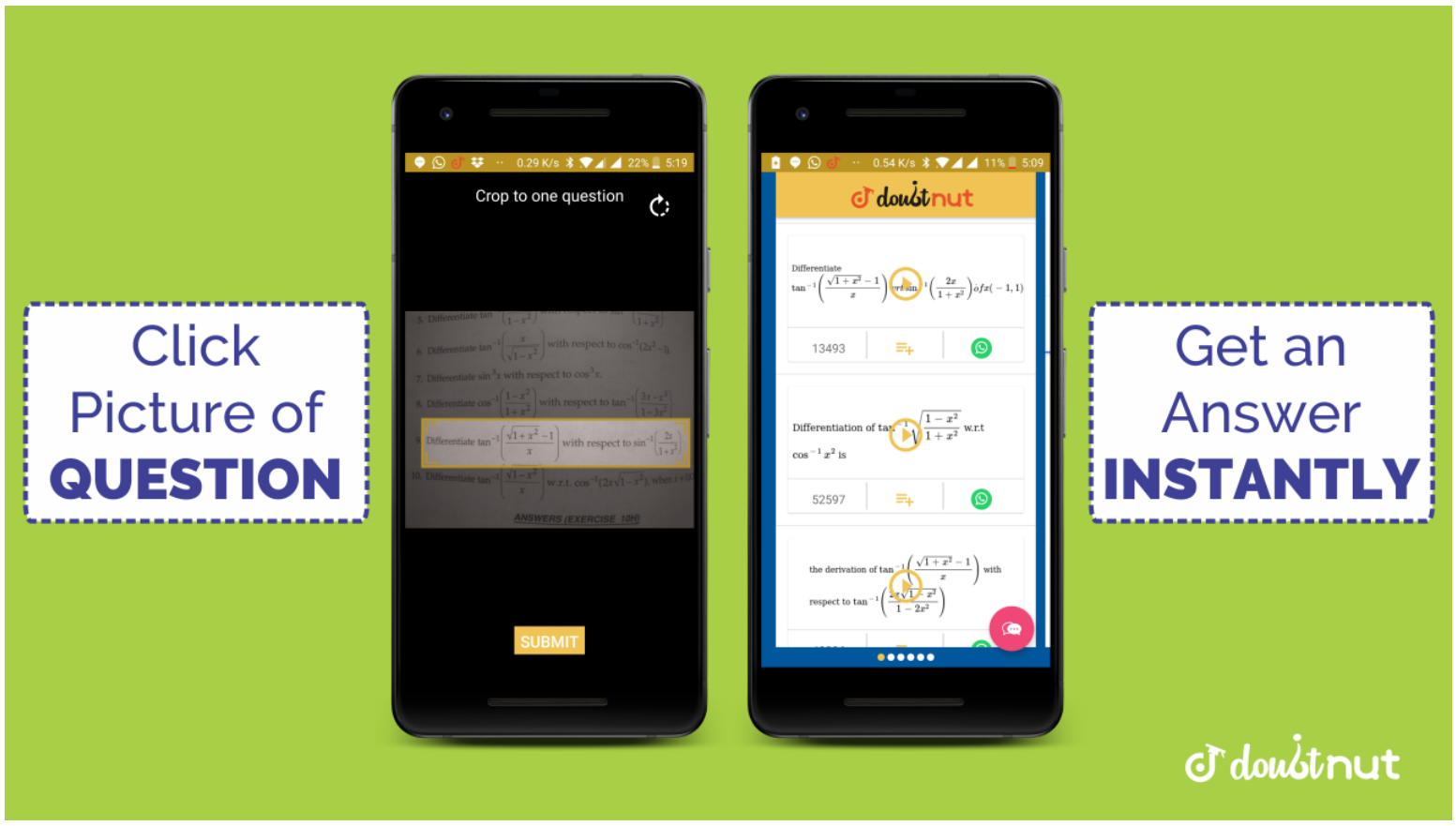

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In $YDSE$, slab of thickness t and refractive index μ is placed in front of any slit. Then displacement of central maximu is terms of fringe width when light of wavelength λ is incident on system is

(A) $\frac{\beta(\mu-1)t}{2\lambda}$

(B) $\frac{\beta(\mu-1)t}{\lambda}$

(C) $\frac{\beta(\mu-1)t}{3\lambda}$

(D) $\frac{\beta(\mu-1)t}{4\lambda}$

CORRECT OPTION: B

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In $H-$ atom spectrum V is the wave number

$V_1 = V_{\min} + V_{\max}$ for layman series

$V_1 = V_{\min} + V_{\max}$ for balmer series then $V_1 : V_2$

(A) $9:2$

(B) $3:2$

(C) $5:2$

(D) $7:2$

CORRECT OPTION: A

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At what distance from his face a person should place concave mirrors of focal length 0.4 m so that magnification in 5 times for a virtual image

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(A) 32

(B) 24

(C) 16

(D) 50

CORRECT OPTION: A

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The mass and sides of cube are given as (10 kg ± 0.1) and $(0.1m \pm 0.01)$ the fractional density is

(A) 0.31

(B) 0.5

(C) 0.62

(D) 0.29

CORRECT OPTION: A

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A string fixed at both ends, oscillate in 4th harmonic. The displacement of particular wave is given as $Y = 2A\sin(5\pi X)\cos(100\pi t)$. Then find the length of the string?

(A) 80 cm

(B) 100cm

(C) 60 cm

(D) 120 cm

CORRECT OPTION: A

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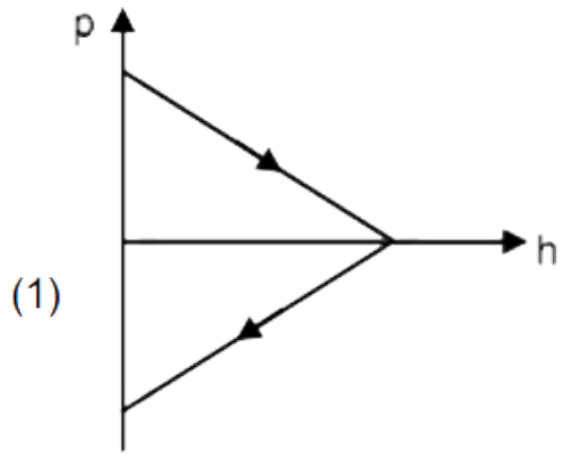
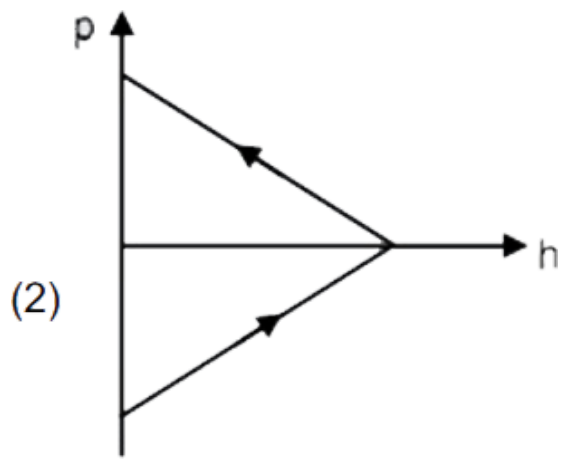
A particle is projected vertically upwards from ground. Which of the following plots best describe the momentum vs height from the ground?

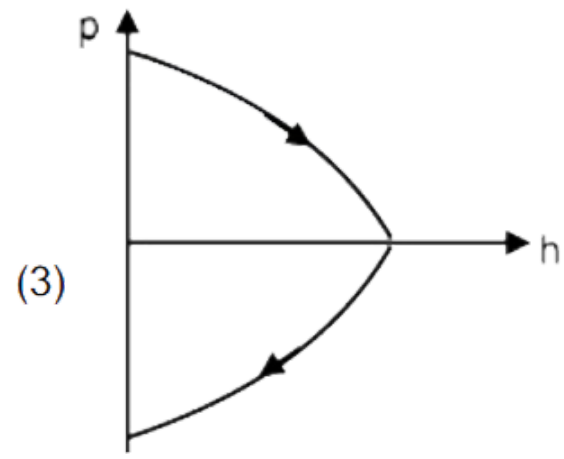
(A)



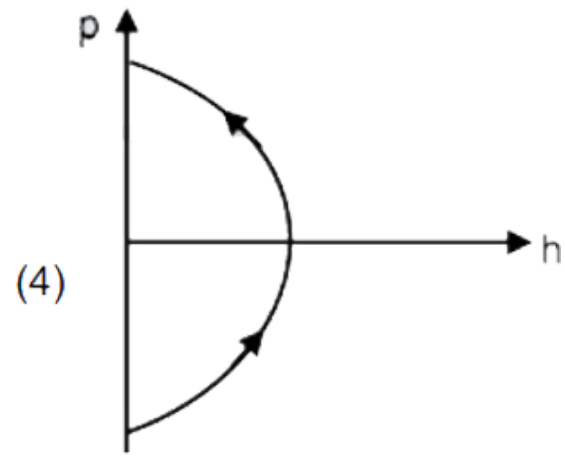
(B)



(C)



(D)



CORRECT OPTION: C

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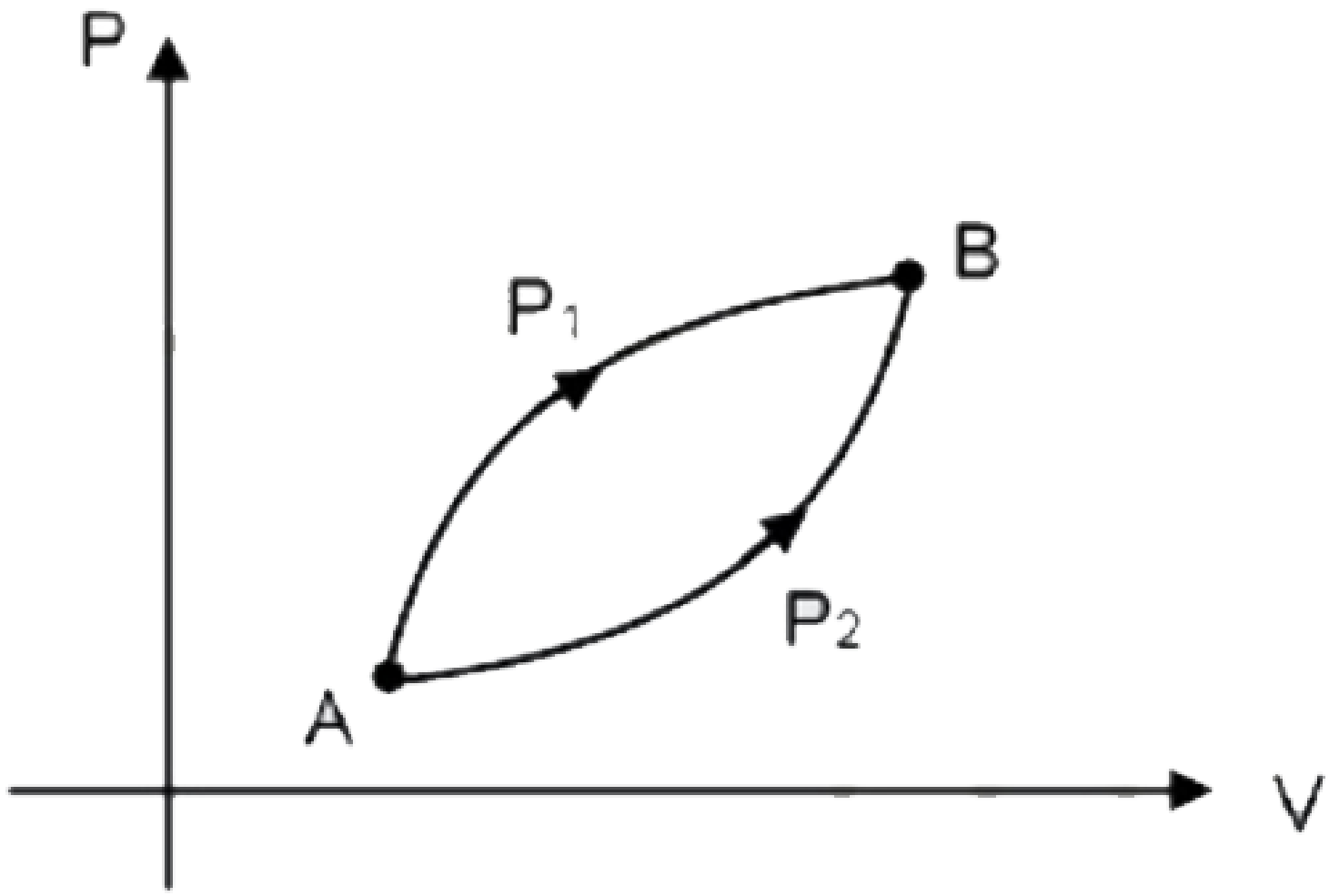

A thermodynamic system undergoes two process P_1 and P_2 from $A \rightarrow B$ as shown in $P-V$ diagram, choose the correct option.

(A) $\triangle U_{P1} = \triangle U_{P2}, QP_1 = Q_{P2}$

(B) $\triangle U_{pq} = \triangle_{p2}\ , QP_1 > Q_{p2}$

(C) $\triangle U_{p1}\ \triangle U_{p2}, QP_1 < Q_{p2}$

(D) $\triangle U_{p1} < \triangle U_{p2}, QP_1 = Q_{p2}$

CORRECT OPTION: B

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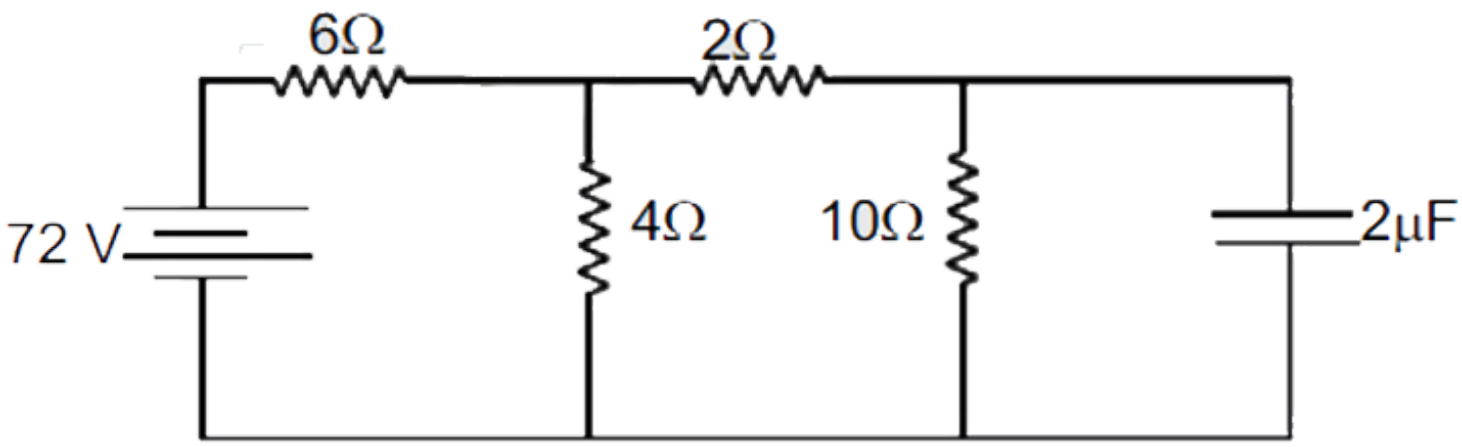

Determine the charge on capacitor in steady state:

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(A) $40\mu C$

(B) $20\mu C$

(C) $15\mu C$

(D) $80\mu C$

CORRECT OPTION: A

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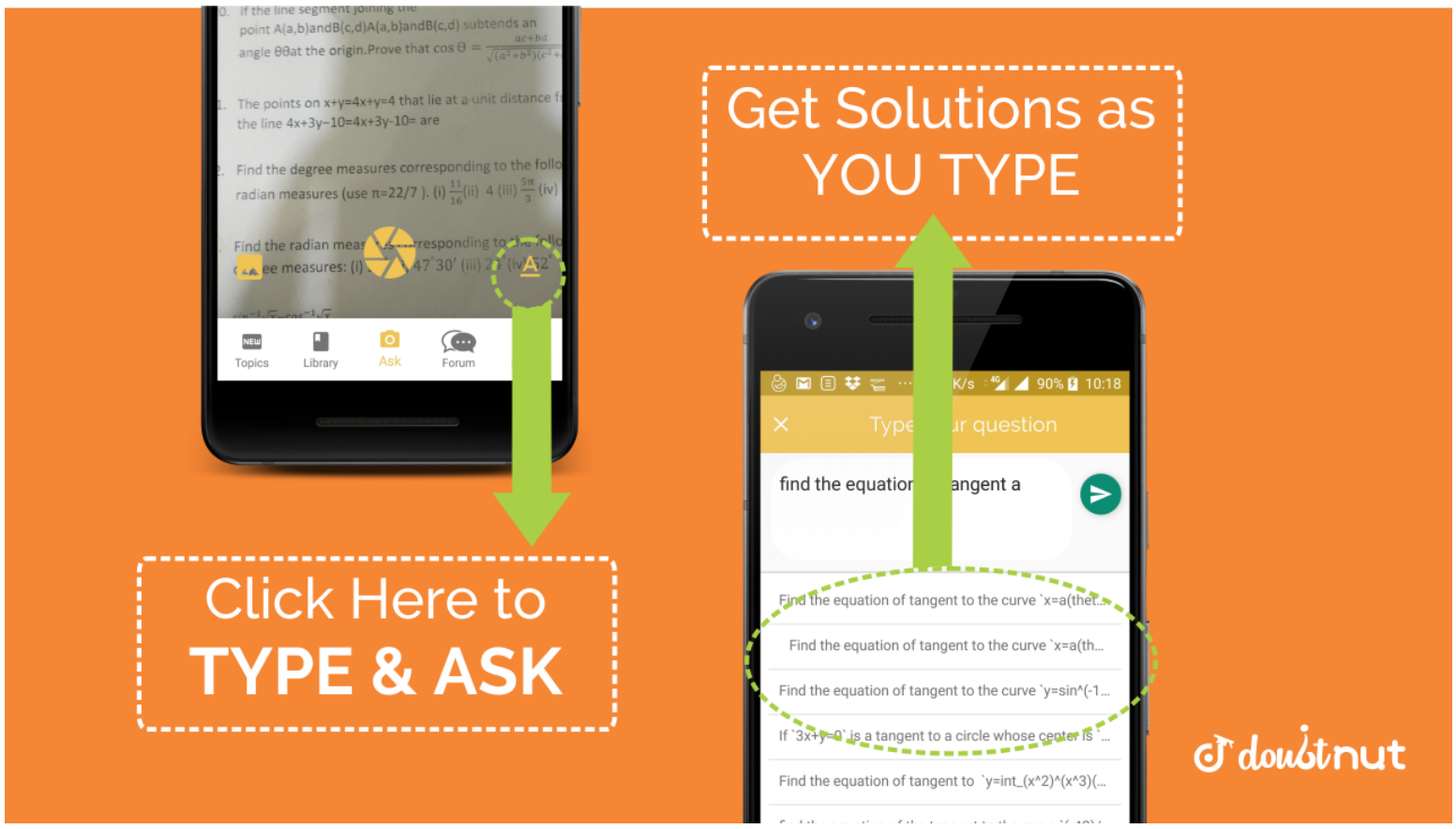

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A charge particle $\left(\neq 10^{-4}C \right)$ is released from rest at $z = 0$ in magnetic fiedl given as $\overrightarrow{B} = B_0 \cos(\omega t + kz)\hat{j}$ where $B_0 = 3 \times 10^{-5}T$ and $B_1 = 2 \times 10^{-6}T$. Then the rms alue of force acting on particle is?

(A) 3×10^{-2}

(B) 0.6

(C) 0.9

(D) 0.1

CORRECT OPTION: B

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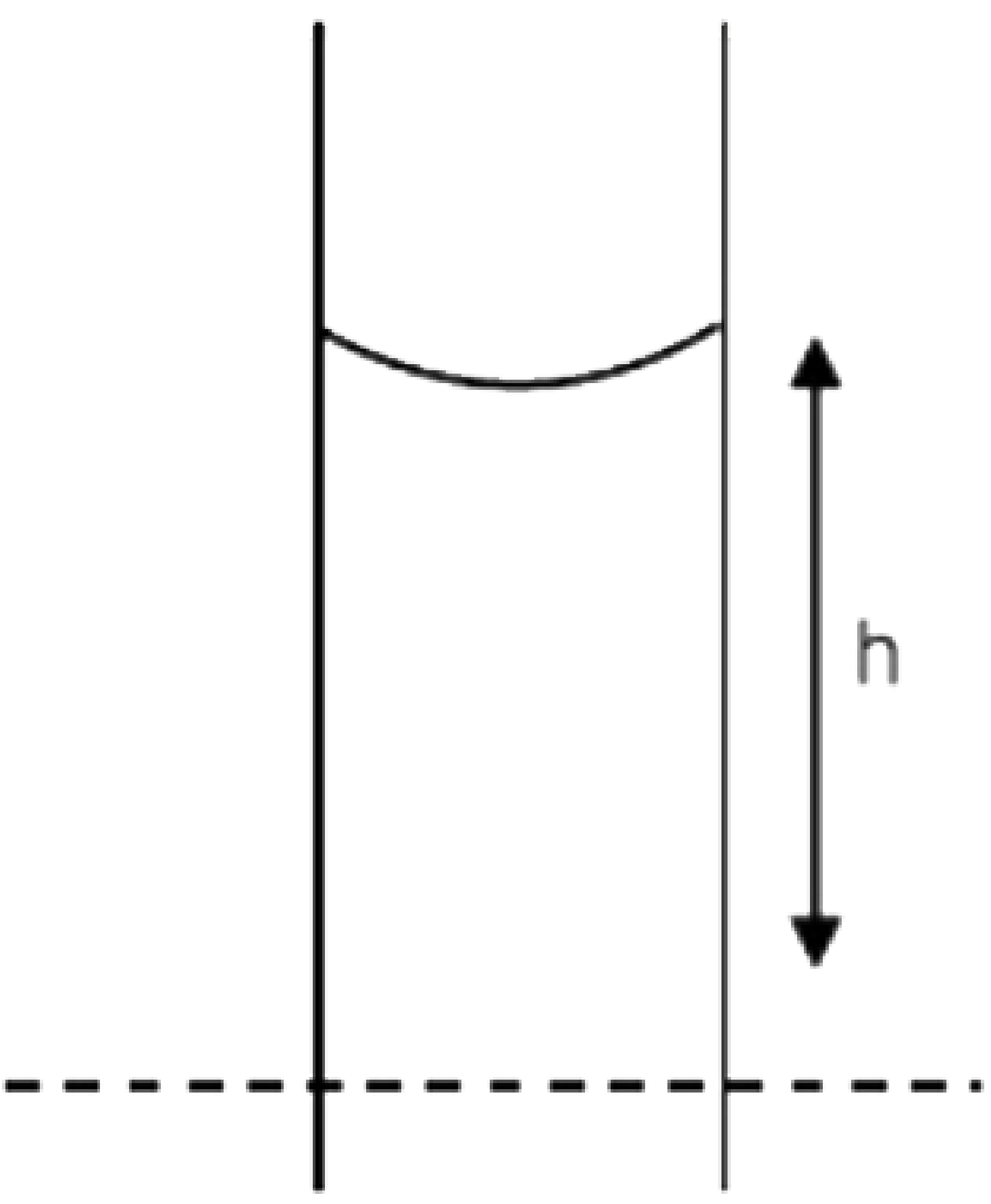

mass m of a liquid rises inside a capillary of radius r. The

mass of fluid that rises when a capillary of radius $2r$ is used is

(A) m

(B) $2m$

(C) $\frac{m}{2}$

(D) $4m$

CORRECT OPTION: B

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r.m.s speed of ideal gas at $127^{\circ}C$ is $200m/s$ the rms. Speed of same ideal gas at temperature $227^{\circ}C$ is

(A) $100\sqrt{5}$

(B) $200\sqrt{5}$

(C) $100\sqrt{5}$

(D) $100\sqrt{10}$

CORRECT OPTION: A

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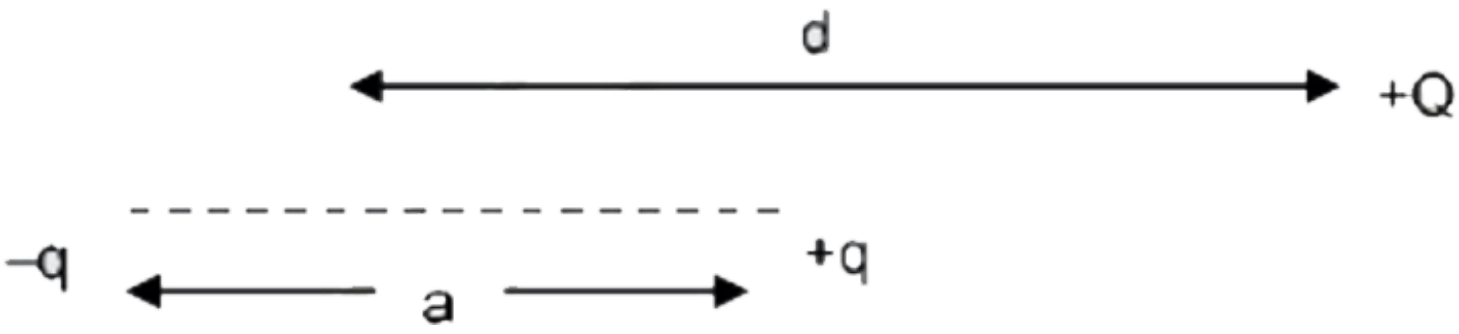

three point charge $-q, q$ and Q are arranged as given in figure. If d is distance from centre of $-q$ and $+q$ to Q and $d > > > a$ then the potential energy of given system is

(A) $\left(\frac{kqQa}{d^2}\right)$

(B) $\left(\frac{+kq^2}{a}+\frac{kqQa}{d^2}\right)$

(C) $\left(\frac{-kq^2}{a}+\frac{kqQa}{2d^2}\right)$

(D) $\left(\frac{-kq^2}{a}+\frac{kqQa}{d^2}\right)$

CORRECT OPTION: D

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Light in incident on a metal plate whose work function is 2 eV. Electric field associated with light is given by $E=E_0\sin\left(\omega t-\frac{2\pi}{5\times10^7}x\right)$ { S.I unit} if energy of photom is given by $\frac{12375}{\lambda(\text{in}A)}$ eV then stopping potential is

(A) $2.48eV$

(B) $0.48eV$

(C) $0.78eV$

(D) $1.24eV$

CORRECT OPTION: B

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Wavelength of the first line of balmer seris is 600 nm. The wavelength of second line of the balmer series will be

(A) 444 nm

(B) 800 nm

(C) 388 nm

(D) 632 nm

CORRECT OPTION: A

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