

Ques No.

Question

**JEE MAINS 09 APRIL 2019 - PAPER 1 SHIFT 2 -
MEMORY BASED - PHYSICS**

$$\vec{r} = 15t^2i + (20 - 20t^2)j$$

find magnitude of acceleration at $t = 1$ sec.

(A) $30m / s^2$

(B) $40m / s^2$

(C) $70m / s^2$

(D) $50m / s^2$

CORRECT OPTION: D[Watch Free Video Solution on Doubtnut](#)

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2 - 9469548

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A string of length 2m is fixed at two ends. It is in resonance with a tuning fork of frequency 240 Hz in its third harmonic.

Then speed of wave sound in string and its fundamental frequency is:

- (A) $240m / s, 80Hz$
- (B) $320m / s, 80Hz$
- (C) $1640m / s, 80Hz$
- (D) $120m / s, 40Hz$

CORRECT OPTION: B

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A & B move in opposite direction with same speed $v = 20 \text{ m/s}$, if frequency heard by is 2000 Hz than original frequency of B is.

- (A) 1950 Hz
- (B) 2350 Hz
- (C) 2250 Hz
- (D) 2550 Hz

CORRECT OPTION: C

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A uniform wire of resistance $= 3\Omega$ and length l is stretched to double its length. Now it is bent to form a circular loop and two point $P \& Q$ lies on the loop such that

they subtend 60° angle at centre. The equivalent resistance between two point P & Q is:

(A) $\frac{5}{3}\Omega$

(B) 12Ω

(C) $\frac{3}{5}\Omega$

(D) $\frac{1}{12}\Omega$

CORRECT OPTION: A

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A cubical block is initially on water such that its $\frac{4}{5}th$ volume is submerged in water. Now oil is poured on water and when block attains equilibrium its half volume is in water and half volume is in oil. The relative density of oil is:

- (A) $\frac{4}{3}$
(B) $\frac{3}{5}$
(C) $\frac{2}{5}$
(D) $\frac{5}{3}$

CORRECT OPTION: B

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Light of intensity $50W / m^2$ is incident on a area of $1m^2$ in such a way that 25 % of light is reflected back. Find the force exerted by light on surface if light incident perpendicularly

(A) $10.8 \times 10^{-8} N$

(B) $15.8 \times 10^{-8} N$

(C) $20.8 \times 10^{-8} N$

(D) $25.8 \times 10^{-8} N$

CORRECT OPTION: C

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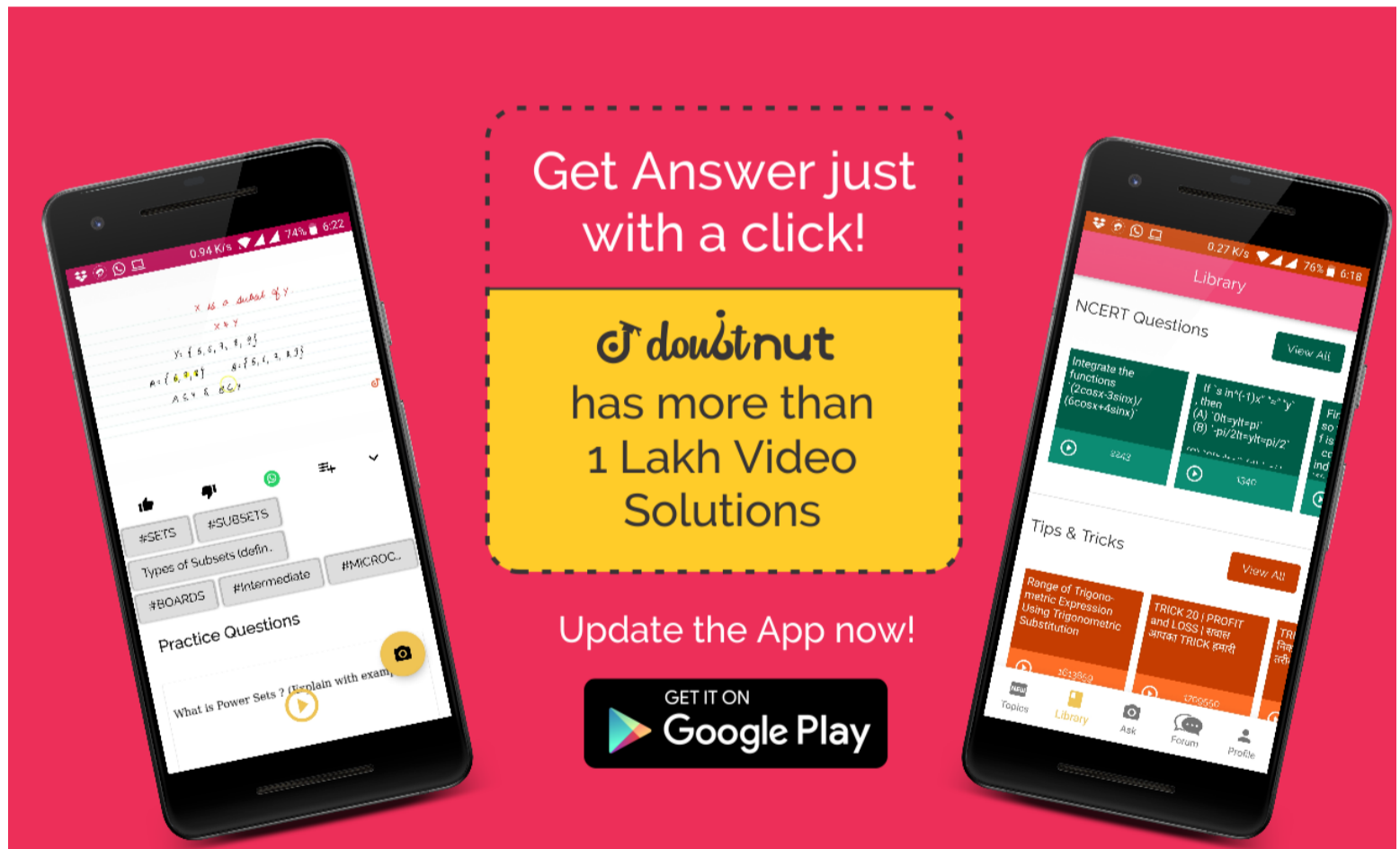
Two conductors of same cross-section and conductivities K , $3K$ and length $3d$ and d respectively are connected end to end as shown in figure. Temperature of end of first conductor is θ_1 and that of second conductor is θ_2 . The temperature of junction in steady state is $(\theta_2 > \theta_1)$

- (A) $\frac{10\theta_2 + 9\theta_1}{19}$
- (B) $\frac{\theta_2 + 9\theta_1}{10}$
- (C) $\frac{9\theta_2 + \theta_1}{10}$
- (D) $\frac{9\theta_2 + 10\theta_1}{19}$

CORRECT OPTION: C

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Height of antenna of transmitter and receiver is proportional to:

(A) frequency of carrier wave

(B) $\frac{1}{\text{modulation frequency}}$

(C) both

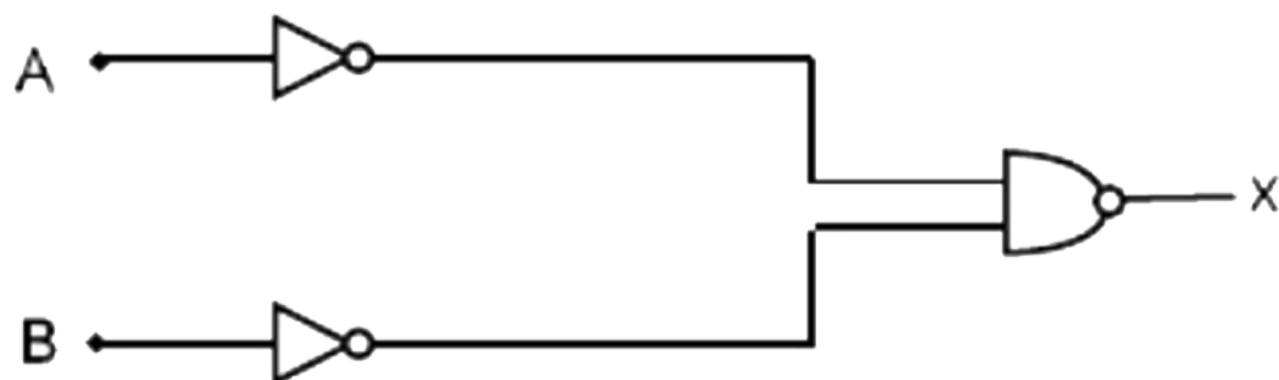
(D) none of these

CORRECT OPTION: B

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The output of the given combination of gates is equivalent

to:

(A) NAND

(B) OR

(C) AND

(D) NOR

CORRECT OPTION: B

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A uniform rod of mass M and length L hinged at centre is rotating in horizontal plane with angular speed ω_0 now two object each of mass m are kept on rod near the hinge on

both sides. They starts sliding towards ends. Find ω of rod finally

- (A) $\frac{M\omega_0}{6M + m}$
- (B) $\frac{M\omega_0}{M + 6m}$
- (C) $\frac{6M\omega_0}{M + m}$
- (D) $\frac{M\omega_0}{M + 2m}$

CORRECT OPTION: B

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The moment of inertia of a rigid body is $1.5kg \times m / s^2$ and its initial angular velocity is zero. It start rotating with uniform angular acceleration $\alpha = 20rad / sec^2$) to achieve a rotational $KE = 1200J$ find the time requiried for this:

(A) 20 sec

(B) 200 sec

(C) 2 sec

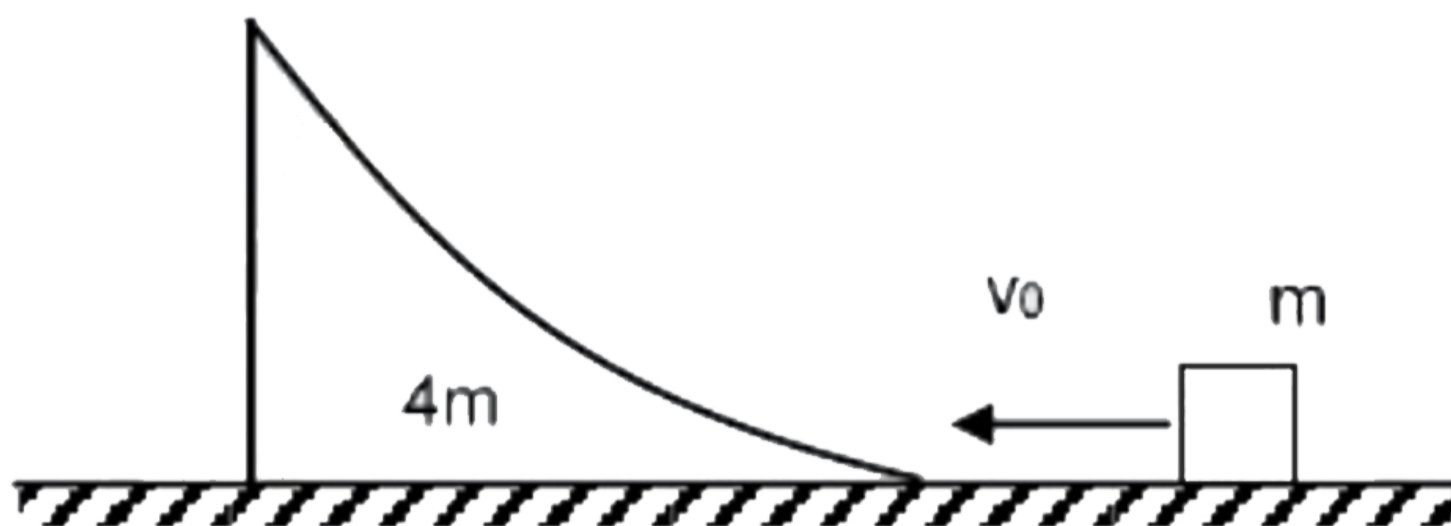
(D) 0.2 sec

CORRECT OPTION: C

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A wedge of mass $4m$ is initially at rest on frictionless horizontal surface. A small block of mass m moving with

speed v_0 and climbs on wedge. Find maximum height achieved by block

(A) $\frac{5v_0^2}{2g}$

(B) $\frac{2}{5} \frac{v_0^2}{g}$

(C) $\frac{v_0^2}{2g}$

(D) $\frac{2v_0^2}{g}$

CORRECT OPTION: B

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A galvanometer of number of turns 175 having 1cm^2 area through 1° when a current of 1mA is passed. Find magnetic field if torsional constant of spring is $10^{-6}\text{N} - \text{m}$

(A) $10^{-4}T$

(B) $10^{-3}T$

(C) $10^{-2}T$

(D) $10^{-1}T$

CORRECT OPTION: B

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**JEE MAINS 09 APRIL 2019 - PAPER 1 SHIFT 2 -
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Two particles of de-broglie wavelength λ_x and λ_y are moving in opposite direction. Find debroglie wavelength after perfectly inelastic collision:

(A) $\frac{\lambda_x \lambda_y}{|\lambda_x - \lambda_y|}$

(B) $\frac{2\lambda_x \lambda_y}{\lambda_x - \lambda_y}$

$$(C) \frac{\lambda_x \lambda_y^2}{\lambda_y - \lambda_x}$$

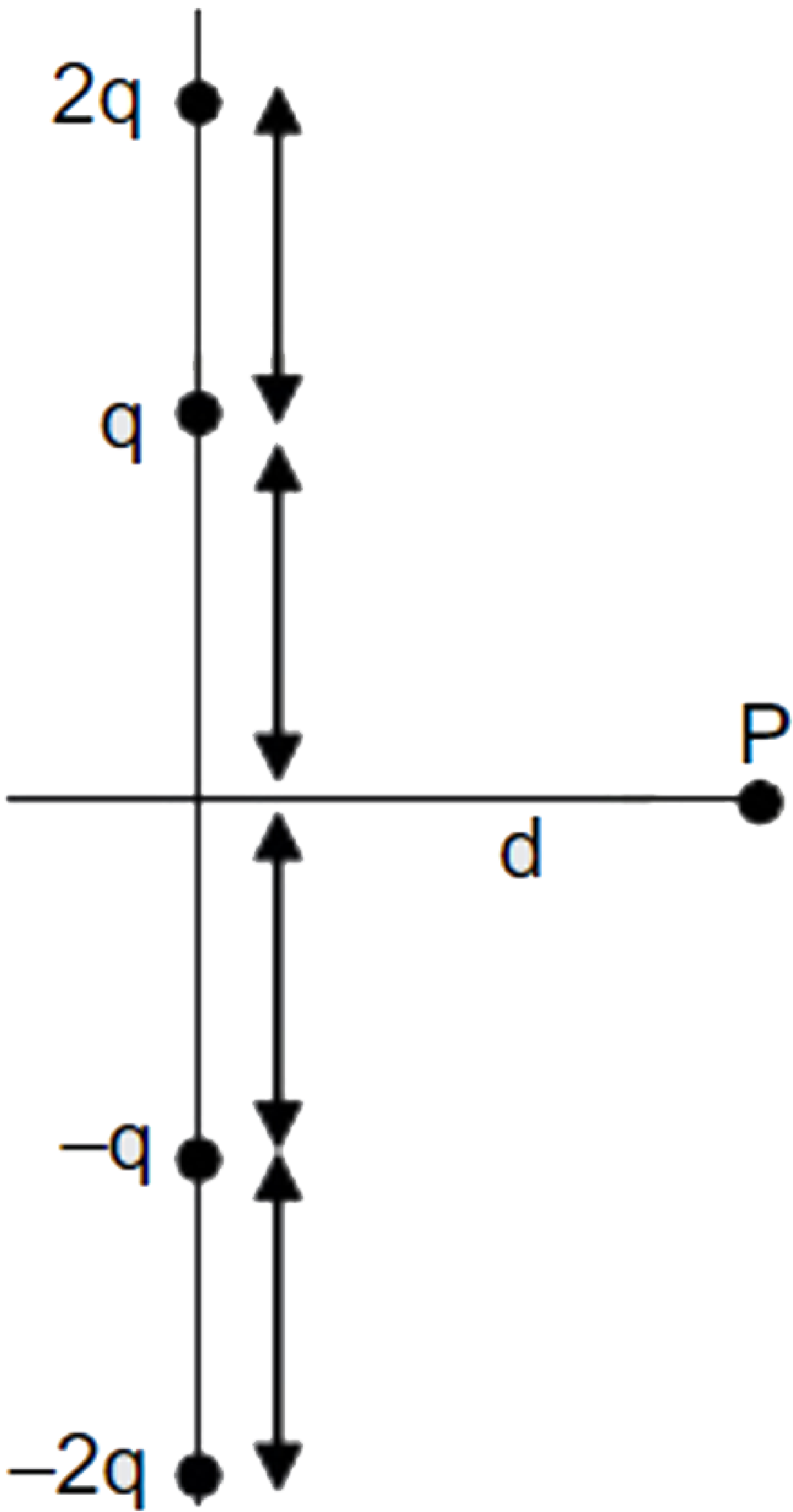
$$(D) \lambda_y - \lambda_x$$

CORRECT OPTION: A

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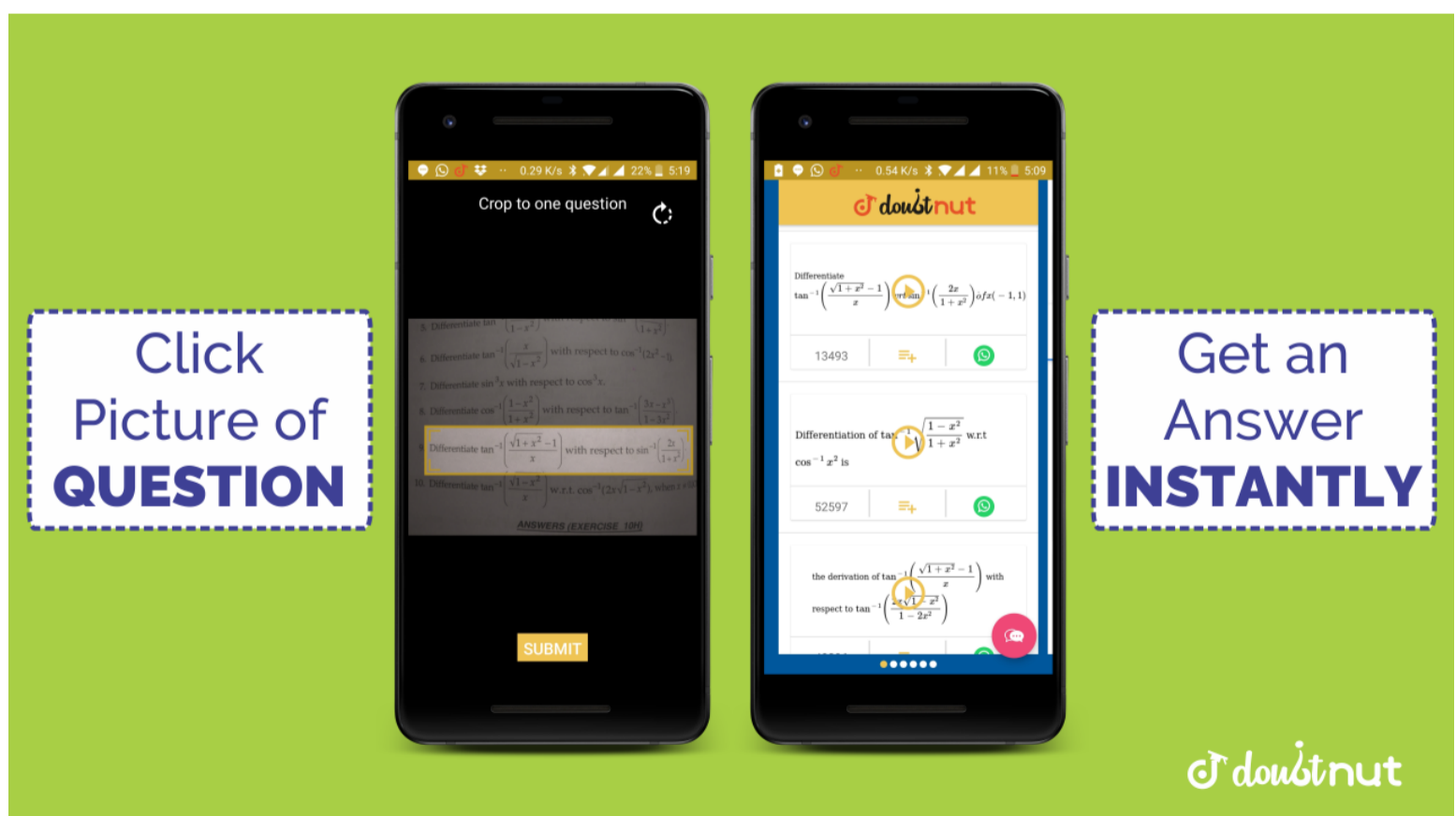
Four charges are arranged on v axis as shown in figure.

Then the electric field at point P is proportional to:

- (A) $\frac{1}{d}$
- (B) $\frac{1}{d^2}$
- (C) $\frac{1}{d^4}$
- (D) 0

CORRECT OPTION: B

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Current passing through galvanometer is 0.002A and resistance of galvanometer is $R_g = 50\Omega$ find out shunt resistance to convert it into ammeter of range 0.5 A

(A) 0.5Ω

(B) 0.2Ω

(C) 0.7Ω

(D) 0.9Ω

CORRECT OPTION: B

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Mass density of sphere of radius R is $\frac{K}{r^2}$. Where K is constant and r is distance from centre. A particle is moving

near surface of sphere along circular path of radius R with time period T . Then

- (A) $\frac{T^2}{R} = \text{constant}$
- (B) $\frac{T}{R} = \text{constant}$
- (C) $\frac{T}{R^2} = \text{constant}$
- (D) $\frac{T^2}{R^3} = \text{constant}$

CORRECT OPTION: B

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For position of real object at x_1 and x_2 ($x_2 > x_1$) magnification is equal to 2. find out $\frac{x_1}{x_2}$ if focal length of converging lens $f = 20\text{cm}$

- (A) $\frac{1}{2}$
(B) $\frac{1}{4}$
(C) 2
(D) 4

CORRECT OPTION: A

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A vector is inclined at $\frac{\pi}{4}$ rad with x-axis $\frac{\pi}{3}$ rad with y-axis
then find angle of vector with z-axis

- (A) $\frac{2\pi}{3} \text{ rad}$
(B) $\frac{5\pi}{3} \text{ rad}$
(C) $\frac{\pi}{4} \text{ rad}$
(D) $\frac{\pi}{2} \text{ rad}$

CORRECT OPTION: A

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Two capacitors of capacitance C and nC are connected in parallel. A battery of emf V is connected across the combination. Now the battery is removed and a dielectric constant K is inserted filling the space between the plates of capacitor of capacitance C . The final potential difference across the system is

- (A) $\frac{n + k}{n + 1}$
(B) $\frac{n + 1}{n + k}$
(C) $\frac{n - 1}{n + K} V$
(D) $\frac{n + 1}{n - k} V$

CORRECT OPTION: B

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An small object is kept at 18cm from combination of a convex lens and plane mirror to get the image on object itself. Now the space between lens and mirror is filled with liquid of refractive index μ_L . Now we need to keep the object at 27cm to get the image on object. Find μ_L .



- (A) $3 < \omega < 4$
- (B) $3 < \omega < \infty$
- (C) $2 < \omega < 3$
- (D) $3 < \omega < 2$

$$\mu = 1.5$$



CORRECT OPTION: A

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A position of particle is $x = at + bt^2 - ct^3$ find out velocity
when acceleration is zero

(A) $v = a + \frac{b^2}{3c}$

(B) $v = a - \frac{b^2}{3c}$

(C) None of these

(D) 1

CORRECT OPTION: A

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**JEE MAINS 09 APRIL 2019 - PAPER 1 SHIFT 2 -
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Two bodies of masses m and $2m$ are moving in same direction with speed $2v$ and v respectively just after collision body of mass m come to rest and body of mass $2m$ splits in two equal parts and move at 45° from initial direction of body of mass m . Find out speed of one part after collision

- (A) $2\sqrt{2}v$
- (B) $\sqrt{2}v$
- (C) $2v$
- (D) None of these

CORRECT OPTION: A

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During a process ideal gas expands to compress the spring such that $10kJ$ energy is stored in the spring and $2kJ$ heat is released from gas to surrounding find the change in internal energy of gas

- (A) $12kJ$
- (B) $10kJ$
- (C) $8kJ$
- (D) $6kJ$

CORRECT OPTION: A

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A block of mass $500g$ and specific heat $400J / KgK$ is attached with a spring of spring constant $800N / m$. Now block is dipped in water of mass $1kg$ and specific heat $4184J / KgK$. Now the spring is elongated by $2cm$ and released. Find rise in temperature of water and block system when block finally comes to rest.

(A) $7.64 \times 10^{-4} K$

(B) $3.64 \times 10^{-3} K$

(C) $3.64 \times 10^{-5} K$

(D) $3.64 \times 10^{-6} K$

CORRECT OPTION: C

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If He^+ ion is in its first excited state then its ionization energy is

(A) $13.6eV$

(B) $48.8eV$

(C) if $f(x) = \begin{cases} 1|\pi x| + 1 & x \leq 5 \\ b|x - \pi| + 3 & x > 5 \end{cases}$

(D) $-13.6eV$

CORRECT OPTION: A

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If in a conductor number density of electrons is 8.5×10^{28} average relaxation time 25 femtosecond mass of electron being 9.1×10^{-31} kg, the resistivity would be of the order.

(A) 10^{-5}

(B) 10^{-6}

(C) 10^{-7}

(D) 10^{-8}

CORRECT OPTION: D

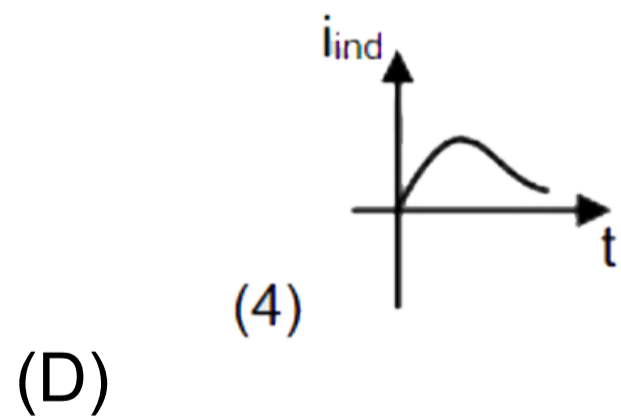
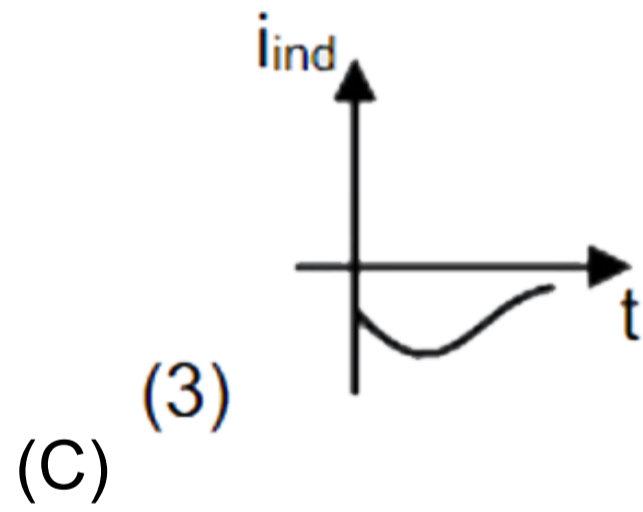
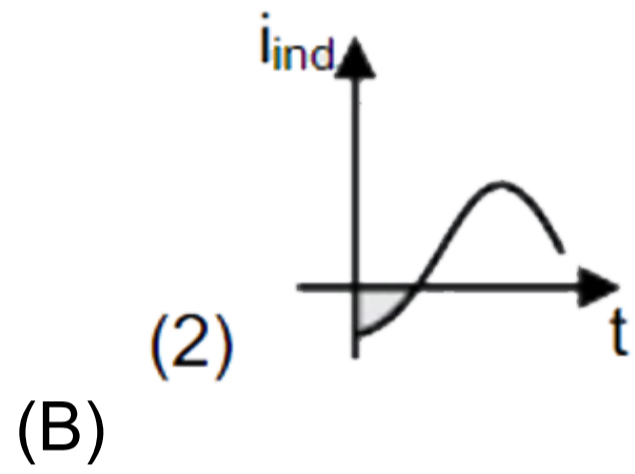
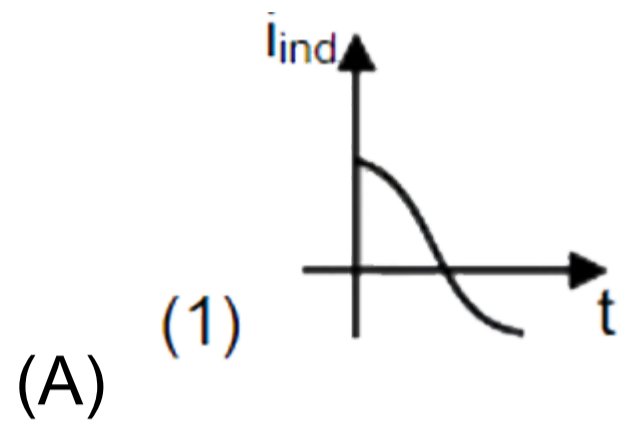
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if current in solenoid is $i_1 = \alpha t e^{\beta t}$. Which of the followign is correct graph between induced current rod time (α and β

are positive)



CORRECT OPTION: A

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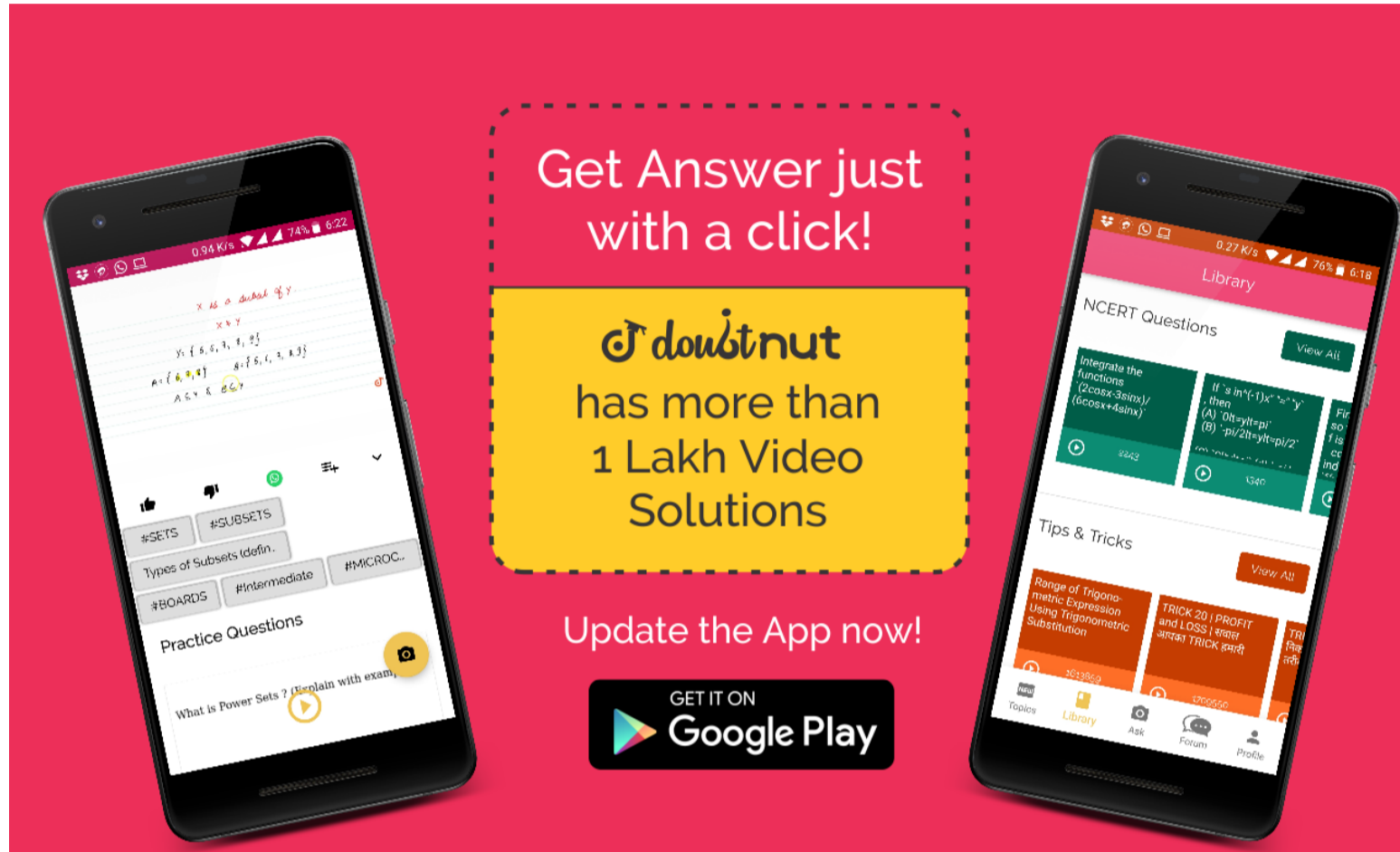
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