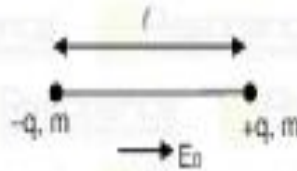


PART : PHYSICS

1. A free dipole is kept in an uniform electric field E_0 as shown in figure. Find time period for small oscillations.



- (1) $T = \pi \sqrt{\frac{ml}{2qE_0}}$
 (2) $T = 2\pi \sqrt{\frac{ml}{qE_0}}$
 (3) $T = \frac{\pi}{2} \sqrt{\frac{ml}{qE_0}}$
 (4) $T = \pi \sqrt{\frac{2ml}{qE_0}}$

Ans. (4)

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2. Velocity $v = At^2 + \frac{Bt}{C+t}$ dimension of [ABC] will be

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

Ans. (1)

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3. A gas is at 27°C . The temperature (is in $^\circ\text{C}$) at which internal energy is doubled, will be :

- (1) 127°C
 (2) 254°
 (3) 527°C
 (4) 327°C

Ans. (4)

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4. Which of the following do not have same dimensions

- (1) Surface Tension and Impulse
 (2) Angular momentum and Planck's Constant
 (3) Torque and work
 (4) Young's modulus and pressure

Ans. (1)

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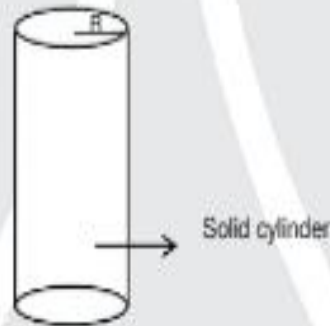
JEE(Main) 2025 | DATE : 29-01-2025 (SHIFT-1) | PAPER-1 | MEMORY BASED | PHYSICS

5. Match the column for net electric field :
- (a) At a point near infinitely large uniformly charged sheet having charge density σ (p) $\frac{\sigma}{\epsilon_0}$
- (b) At a point between two infinitely large uniformly charged sheets having charge densities $+\sigma$ & $-\sigma$ (q) $\frac{\sigma}{2\epsilon_0}$
- (c) At a point inside uniformly charged hollow sphere having charge density σ (r) $\frac{\sigma R^2}{\epsilon_0 r^2}$
- (d) At a point outside uniformly charged hollow sphere having charge density σ (s) 0
- (1) a - r, b - p, c - s, d - q
(2) a - q, b - p, c - s, d - r
(3) a - q, b - s, c - p, d - r
(4) a - q, b - r, c - s, d - p

Ans. (2)

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6. In a current carrying solid cylinder find r ($< R$ and $> R$) for which magnetic field B is half of maximum value of magnetic field.



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

Ans. (1)

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7. A boat is moving in a river down stream with velocity 27 km/hr with respect to river. Velocity of river is 9 km/hr. A ball is thrown with velocity 10 m/s vertically upwards from the boat with respect to the boat. Find horizontal range of ball with respect to ground.

- (1) 20 meter (2) 10 meter (3) 30 meter (4) 40 meter

Ans. (1)

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8. Radius of first orbit of H atom is an debroglie wavelength of electron is second orbit will be

- (1) $2\pi a_0$ (2) $4\pi a_0$ (3) $6\pi a_0$ (4) $8\pi a_0$

Ans. (2)

Sol. $2\pi r_2 = n\lambda_0$

$$\lambda_0 = \frac{2\pi r_2}{n} = \frac{2\pi}{n} (4a_0) = \frac{8\pi a_0}{n}$$

9. A particle is moving along a circular path in vertical plane connected with a light string. Speed of the particle at highest point is $n\sqrt{gR}$. Find ratio of kinetic energy of the particle at lowest and highest point.

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

Ans. (1)

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10. **Statement – I :** Time period of simple pendulum is more at top of mountain than bottom

Statement – II : If value of g decrease time period of simple pendulum increases or vice versa

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
 (2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
 (3) Statement-1 is True, Statement-2 is False
 (4) Statement-1 is False, Statement-2 is True

Ans. (1)

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11. A coil rotating about its axis with angular speed ω in uniform magnetic field B which is perpendicular to plane of coil. If area of the coil is A , Magnetic flux and induced emf in coil will be

- (1) zero and $\frac{BdA}{dt}$ (2) zero and zero
 (3) BA and zero (4) BA and $\frac{BdA}{dt}$

Ans. (3)

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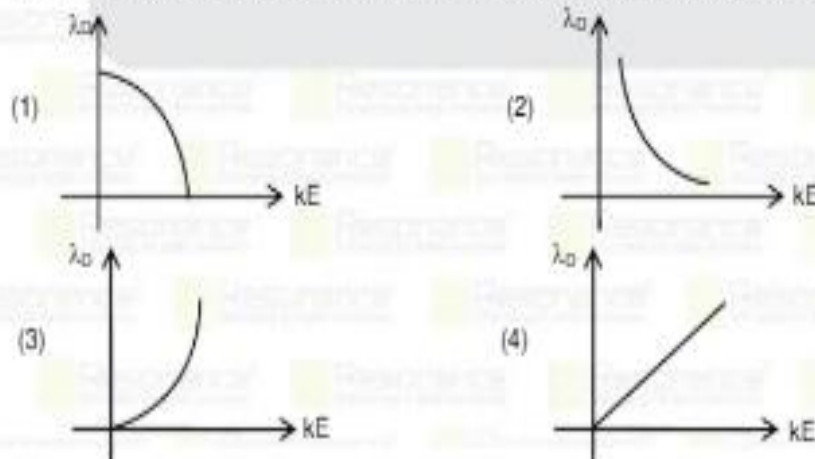
12. Two coils having current I_1 and I_2 placed nearby each other. If currents in coils are changing with time then induced emf in first coil will be (L is self inductance of each coil and M is mutual inductance of both the coils)

- (1) $e = -L \frac{dI_2}{dt} - \frac{MdI_2}{dt}$ (2) $e = -L \frac{dI_1}{dt} - \frac{MdI_1}{dt}$
 (3) $e = -L \frac{dI_1}{dt} - \frac{MdI_2}{dt}$ (4) $e = -L \frac{dI_2}{dt} - \frac{MdI_1}{dt}$

Ans. (3)

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13. Which of the following graph is correct between de-broglie wavelength and kinetic energy



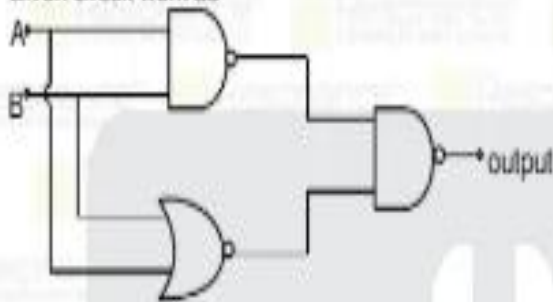
14. A particle projected with same speed at angles $(45 - \alpha)$ and $(45 + \alpha)$ from horizontal then ratio of maximum height attained by them will be

- (1) $\frac{1 + \cos 2\alpha}{1 - \cos 2\alpha}$ (2) $\frac{1 - \cos 2\alpha}{1 + \cos 2\alpha}$ (3) $\frac{1 - \sin 2\alpha}{1 + \sin 2\alpha}$ (4) $\frac{1 + \sin 2\alpha}{1 - \sin 2\alpha}$

Ans. (3)

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15. Given circuit work as

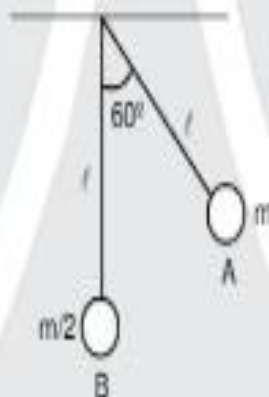


- (1) NAND (2) AND (3) OR (4) NOR

Ans. (3)

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16. Two balls A and B are suspended as shown in figure. If ball A is released then find velocity of ball A after elastic collision



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

Ans. (2)

Sol. [Watch Video Solution](#)