

Oscillations

NEET previous year questions · Physics

6 questions from the official papers: NEET 2026 (3), Re-NEET 2026 (2), NEET 2020 (1). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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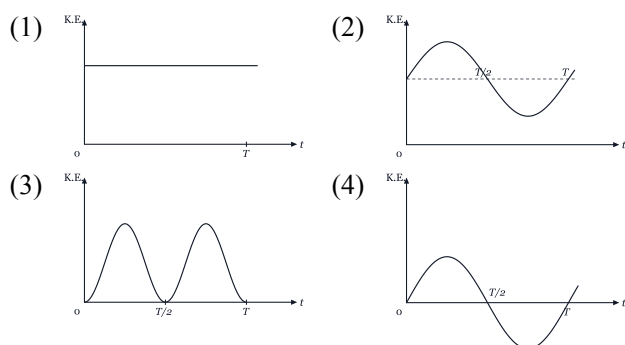
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1. NEET 2026 · Q5

For a simple pendulum, having time period T , the variation of kinetic energy (K.E.) with time (t) is represented by:



Answer (3)

Sol. The velocity in simple harmonic motion (SHM) is $v = A\omega \cos(\omega t + \phi)$, so the kinetic energy $K = \frac{1}{2}mA^2\omega^2 \cos^2(\omega t + \phi)$ is proportional to $\cos^2(\omega t + \phi)$. This is always non-negative and repeats with period $T/2$, producing two identical humps between 0 and T that fall to zero at the extreme positions. Graph (3) shows exactly this, so the answer is (3).

2. NEET 2026 · Q16

The sum of kinetic energy and potential energy of a simple pendulum bob is 0.02 joule. The speed of the simple pendulum bob at equilibrium position is approximately: (Consider mass of the bob = 20 g)

- (1) 0.2 m/s (2) 1.41 m/s
(3) 14.1 m/s (4) 2.0 m/s

Answer (2)

Sol. At the equilibrium (lowest) point the bob's energy is entirely kinetic, so $\frac{1}{2}mv^2$ equals the total energy 0.02 J. With $m = 20 \text{ g} = 0.02 \text{ kg}$, $v^2 = \frac{2(0.02)}{0.02} = 2$, giving $v = \sqrt{2} \approx 1.41 \text{ m/s}$ (option (2)). Forgetting to divide by the mass gives $\sqrt{2(0.02)} = 0.2 \text{ m/s}$ (option (1)).

3. NEET 2026 · Q33

Savitha, a XI standard student, while conducting an experiment to determine the effective length of a simple pendulum L , notes down the data of time taken to complete 30 oscillations as 60 s and hence calculates the length of the simple pendulum as: (Take $\pi^2 = 9.8$, and $g = 9.8 \text{ m/s}^2$)

- (1) 0.75 m (2) 1.5 m (3) 2 m (4) 1 m

Answer (4)

Sol. The time period is $T = 60/30 = 2 \text{ s}$. From $T = 2\pi\sqrt{L/g}$, the length is $L = \frac{gT^2}{4\pi^2} = \frac{9.8 \times 4}{4 \times 9.8} = 1 \text{ m}$. The other options result from arithmetic or period errors.

4. Re-NEET 2026 · Q25

A cylindrical cork of uniform density floats in a liquid of density ρ_1 . If the cork is depressed slightly and released, it oscillates harmonically with time period T . If the same cork floats in another liquid of density ρ_2 , then the similar oscillation has time period $2T$. The value of ρ_2/ρ_1 is:

- (1) 4 (2) 2 (3) 1/2 (4) 1/4

Answer (4)

Sol. Depressing the cork by x creates an extra buoyant force $A\rho g x$ directed back towards equilibrium, so the effective spring constant is $k = A\rho g$ and $T = 2\pi\sqrt{\frac{m}{A\rho g}}$. With m and A unchanged, $T \propto \rho^{-1/2}$. Doubling the period therefore requires the density to fall by a factor of four: $\frac{\rho_2}{\rho_1} = \frac{1}{4}$. NCERT Class 11,

Oscillations (simple harmonic motion (SHM) examples).

5. Re-NEET 2026 · Q28

Consider a spring-mass simple harmonic oscillator in one dimension. The mass of the particle is m kg and the spring constant is $k \text{ Nm}^{-1}$. At a given instant, the extension of the spring is x -meter and the speed of the particle is $v \text{ ms}^{-1}$. On the x - v plane, if the graph of v as a function of x is a circle, then the correct option is:

- (1) $k = \frac{1}{m}$ (2) $k = m$
(3) $k = m^2$ (4) $k = \sqrt{m}$

Answer (2)

Sol. Conservation of energy gives $\frac{1}{2}mv^2 + \frac{1}{2}kx^2 = E$,
which rearranges to $\frac{v^2}{2E/m} + \frac{x^2}{2E/k} = 1$ - an ellipse in the $x-v$ plane. An ellipse becomes a CIRCLE only when the two semi-axes are equal, i.e. $\frac{2E}{m} = \frac{2E}{k}$, which requires $k = m$ numerically. NCERT Class 11, Oscillations (energy in simple harmonic motion).

6. NEET 2020 · Q153

The phase difference between displacement and acceleration of a particle in a simple harmonic motion is

- (1) $3\pi/2$ rad (2) $\pi/2$ rad
(3) zero (4) π rad

Answer (4)

Sol. In SHM, $a = -\omega^2 x$. Acceleration is therefore exactly opposite to displacement, giving a phase difference of π radians. Chapter: Oscillations.

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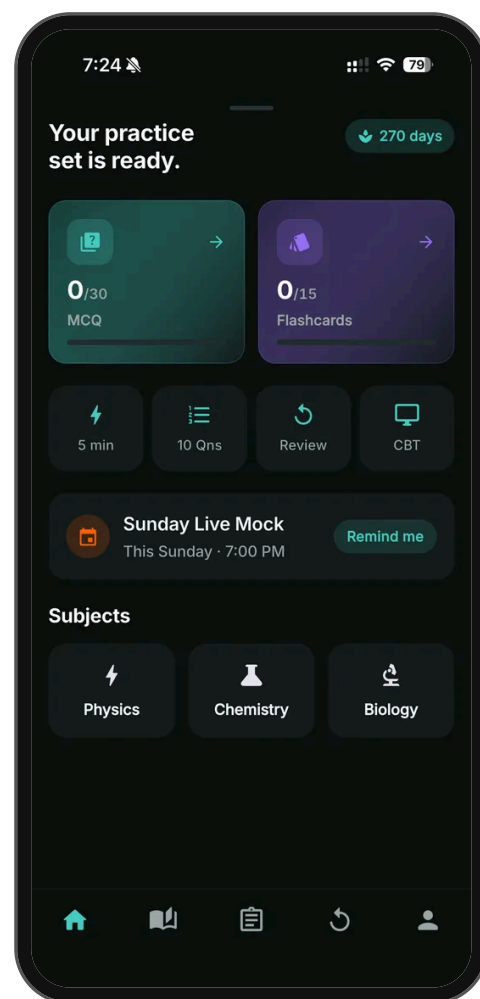
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