

15 Lecture - PHY101

Important Mcqs

Which of the following is a necessary condition for simple harmonic motion?

- A) Force is directly proportional to velocity
- B) Acceleration is directly proportional to position
- C) Velocity is directly proportional to position
- D) Acceleration is directly proportional to velocity

Answer: B) Acceleration is directly proportional to the position

Which of the following is true for the displacement of a simple harmonic oscillator?

- A) It is directly proportional to the velocity of the oscillator.
- B) It is directly proportional to the acceleration of the oscillator.
- C) It is proportional to the square of the velocity of the oscillator.
- D) It is proportional to the square of the acceleration of the oscillator.

Answer: B) It is directly proportional to the acceleration of the oscillator.

A simple pendulum oscillates with a period T . If the length of the pendulum is doubled, what is the new period of oscillation?

- A) $T/2$
- B) T
- C) $2T$
- D) $4T$

Answer: C) $2T$

The restoring force in a simple harmonic oscillator is given by $F = -kx$, where x is the displacement from equilibrium and k is the spring constant. What is the period of oscillation?

- A) $T = 2\pi/k$

B) $T = \pi/k$

C) $T = 2\pi/(k/m)$

D) $T = \pi/(k/m)$

Answer: D) $T = \pi/(k/m)$

Which of the following quantities remains constant in simple harmonic motion?

A) Amplitude

B) Frequency

C) Phase

D) Energy

Answer: D) Energy

A mass attached to a spring oscillates with a period of 2 seconds. What is the frequency of oscillation?

A) 1 Hz

B) 0.5 Hz

C) 2 Hz

D) 4 Hz

Answer: A) 1 Hz

The amplitude of a simple harmonic oscillator is 0.2 m and its period is 5 seconds. What is the maximum velocity of the oscillator?

A) 0.04 m/s

B) 0.2 m/s

C) 0.4 m/s

D) 1 m/s

Answer: C) 0.4 m/s

The motion of a particle is described by the equation $x = 3\cos(2\pi t)$ where x is the displacement from equilibrium and t is time. What is the frequency of oscillation?

A) 1 Hz

- B) 2 Hz
- C) 3 Hz
- D) 4 Hz

Answer: B) 2 Hz

The kinetic energy of a simple harmonic oscillator is maximum when the displacement is:

- A) At the equilibrium position
- B) At the maximum displacement from the equilibrium
- C) At the minimum displacement from equilibrium
- D) The kinetic energy is the same at all points

Answer: A) At the equilibrium position

The period of a simple pendulum of length L and mass m is given by $T = 2\pi\sqrt{L/g}$, where g is the acceleration due to gravity. If the length of the pendulum is doubled, what is the new period of oscillation?

- A) T
- B) $2T$
- C) $T/2$
- D) $4T$

Answer: B) $2T$