

Prayas JEE (2025)

Physics

Oscillations

DPP: 1

Q1 The equation of motion of a particle executing S.H.M. where letters have usual meaning is:

- (A) $\frac{d^2x}{dt^2} = -\frac{k}{m}x$
 (B) $\frac{d^2x}{dt^2} = +\omega^2x$
 (C) $\frac{d^2x}{dt^2} = -\omega^2x^2$
 (D) $\frac{d^2x}{dt^2} = -kmx$

Q2 The equation of motion of a particle executing SHM is $\left(\frac{d^2x}{dt^2}\right) + kx = 0$. The time period of the particle will be:

- (A) $2\pi/\sqrt{k}$
 (B) $2\pi/k$
 (C) $2\pi k$
 (D) $2\pi\sqrt{k}$

Q3 Which of the following equation does not represent a simple harmonic motion:

- (A) $y = a \sin \omega t$
 (B) $y = b \cos \omega t$
 (C) $y = a \sin \omega t + b \cos \omega t$
 (D) $y = a \tan \omega t$

Q4 The displacement of a particle in S.H.M. is indicated by equation $y = 10 \sin(20t + \pi/3)$ where y is in metres. The value of time period of vibration will be (in seconds):

- (A) $10/\pi$
 (B) $\pi/10$
 (C) $2\pi/10$
 (D) $10/2\pi$

Q5 The value of phase at maximum displacement from the mean position of a particle in S.H.M. is:

- (A) $\pi/2$ (B) π
 (C) Zero (D) 2π

Q6 The equation of a simple harmonic motion is $x = 0.34 \cos(3000t + 0.74)$. Where x and t are in mm and sec. respectively. The frequency of the motion is:

- (A) 3000
 (B) $3000/2\pi$
 (C) $0.74/2\pi$
 (D) $3000/\pi$

Q7 The acceleration of a particle executing S.H.M. is

- (A) Always directed towards the equilibrium position
 (B) Always towards the one end
 (C) Continuously changing in direction
 (D) Maximum at the mean position

Q8 The distance covered by a particle executing SHM, in one time period is equal to:

- (A) Four times the amplitude
 (B) Two times the amplitude
 (C) One times the amplitude
 (D) Eight times the amplitude

Q9 The phase of a particle in S.H.M. is $\pi/2$, then:

- (A) Its velocity will be maximum.
 (B) Its acceleration will be minimum.
 (C) Restoring force on it will be minimum.
 (D) Its displacement will be maximum.

Q10 The displacement of a particle in S.H.M. is indicated by equation $y = 10 \sin(20t + \pi/3)$


[Android App](#)
[iOS App](#)
[PW Website](#)

where y is in metres. The value of maximum velocity of the particle will be:

- (A) 100 m/sec.
- (B) 150 m/sec.
- (C) 200 m/sec.
- (D) 400 m/sec.

Q11 The displacement of a particle in S.H.M. is indicated by equation $y = 10 \sin(20t + \pi/3)$ where y is in metres. The value of phase constant will be:

- (A) Zero
- (B) 45°
- (C) 60°
- (D) 30°

Q12 The phase difference between the displacement and acceleration of particle executing S.H.M. in radian is:

- (A) $\pi/4$
- (B) $\pi/2$
- (C) π
- (D) 2π

Q13 The phase difference in radians between displacement and velocity in S.H.M. is

- (A) $\pi/4$
- (B) $\pi/2$
- (C) π
- (D) 2π



[Android App](#)

| [iOS App](#)

| [PW Website](#)

Answer Key

Q1 (A)

Q2 (A)

Q3 (D)

Q4 (B)

Q5 (A)

Q6 (B)

Q7 (A)

Q8 (A)

Q9 (D)

Q10 (C)

Q11 (C)

Q12 (C)

Q13 (B)



[Android App](#)

| [iOS App](#)

| [PW Website](#)

ATDB.uno