JEE

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Physics

Oscillations

DPP: 3

Q1 A simple harmonic oscillation has an amplitude A and time period T. The time required to travel from $x = A$ to $x = \frac{A}{2}$ is
(A) $\frac{T}{6}$
(B) $\frac{T}{4}$
(C) $\frac{T}{3}$
(D) $\frac{T}{12}$

Q2 A particle is executing SHM with time period T. The time taken by it to travel from mean position to $\frac{1}{\sqrt{2}}$ times its amplitude is equal to
(A) $\frac{T}{6}$
(B) $\frac{T}{12}$
(C) $\frac{T}{8}$
(D) $\frac{T}{4}$

Q3 Which one of the following statements is true for the speed v and the acceleration a of a particle executing simple harmonic motion?
(A) When v is maximum, a is maximum.
(B) Value of a is zero, whatever may be the value of v.
(C) When v is zero, a is zero.
(D) When v is maximum, a is zero.

Q4 The phase difference between the instantaneous velocity and acceleration of a particle executing simple harmonic motion is:
(A) 0.5π
(B) π
(C) 0.707π
(D) zero

Q5 The average velocity of a particle executing SHM in one complete vibration is:
(A) zero
(B) $\frac{A\omega}{2}$
(C) $A\omega$
(D) $\frac{A\omega^2}{2}$

Q6 Two simple harmonic motions are given by $y_1 = a\sin\left[\left(\frac{\pi}{2}\right)t + \phi\right]$ and $y_2 = b\sin\left[\left(\frac{2\pi}{3}\right)t + \phi\right]$. The phase difference between these after 1 s is
(A) Zero
(B) $\frac{\pi}{2}$
(C) $\frac{\pi}{4}$
(D $\frac{\pi}{6}$

Q7 Which of the following is not simple harmonic function?
(A) $y = a\sin 2\omega t + b\cos^2 \omega t$
(B) $y = a\sin \omega t + b\cos 2\omega t$
(C) $y = 1 - 2\sin^2 \omega t$
(D) $y = \left(\sqrt{a^2 + b^2}\right)\sin \omega t \cos \omega t$

Q8 The displacement of a particle varies according to the relation $y = 4(\cos \pi t + \sin \pi t)$. The amplitude of the particle is
(A) 8 units
(B) 2 units
(C) 4 units
(D) $4\sqrt{2}$ units

Q9 A S.H.M. is represented by $x = 5\sqrt{2}(\sin 2\pi t + \cos 2\pi t)$. The amplitude of the S.H.M. is

(A) $10\ \text{cm}$
(B) $20\ \text{cm}$
(C) $5\sqrt{2}\ \text{cm}$
(D) $50\ \text{cm}$

Q10 For a particle undergoing simple harmonic motion, the velocity is plotted against displacement. The curve will be
(A) a straight line
(B) a parabola
(C) a circle
(D) an ellipse

Answer Key

Q1	(A)	Q6	(D)
Q2	(C)	Q7	(B)
Q3	(D)	Q8	(D)
Q4	(A)	Q9	(A)
Q5	(A)	Q10	(D)

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