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Q 1. A particle moves such that its acceleration is given by: $\alpha = -\beta(x-2)$

> Here : β is a positive constant and x the position from origin. Time period of oscillations is:

(a)
$$2\pi\sqrt{\beta}$$
 (b) $2\pi\sqrt{\frac{1}{\beta}}$
(c) $2\pi\sqrt{\beta+2}$ (d) $2\pi\sqrt{\frac{1}{\beta}}$

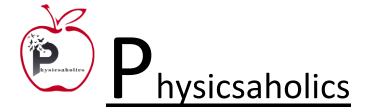
(c)
$$2\pi\sqrt{\beta} + 2$$

Q 2. The maximum acceleration of a particle in SHM is made two times keeping the maximum speed to be constant. It is possible when:

- (a) amplitude of oscillation is doubled while frequency remains constant
- (b) amplitude is doubled while frequency is halved
- (c) frequency is doubled while amplitude is halved
- (d) frequency of oscillation is doubled while amplitude remains constant

A particle moves according to the law $x = a \cos \frac{\pi t}{2}$. The distance covered by it in the Q 3. time interval between t = 0 to t = 3 s is: (a) 2a (b) 3a (c) 4a (d) a

- For a particle executing SHM, which of the following statements does not hold good? Q4. (a) Frequency of speed is two times of that of displacement.
 - (b) the restoring force is always directed towards a fixed point
 - (c) the restoring force is maximum at the extreme positions
 - (d) the velocity of the particle is minimum at the centre of motion of the particle
- Q 5. The acceleration of a particle moving along x-axis is a = -100x + 50. It is released from x = 2. Here 'a' and 'x' are in S.I units. The motion of particle will be : (a) periodic, oscillatory but not SHM. (b) periodic but not oscillatory.
 - (c) oscillatory but not periodic.
- (d) simple harmonic.
- Q 6. For a particle in S.H.M., if the amplitude of displacement is 'a' and the amplitude of velocity is 'v' the amplitude of acceleration is
 - (b) $\frac{v^2}{\tilde{z}}$ (c) $\frac{v^2}{2a}$ (d) $\frac{v}{a}$ (a) va





Q 7. A particle executes SHM along x-axis about the centre at x = -a with frequency f Hz. Initially the particle is at rest at the origin. Its equation of motion will be (a) $x = 2a(1 - \cos 2\pi ft)$ (b) $x = a \cos 2\pi ft$ (c) $x = a (\cos 2\pi ft - 1)$ (d) $x = a (1 - \cos 2\pi ft)$

Q 8. A particle moves according to the equation $x = a \operatorname{Sin}^2 \left(\omega t - \frac{\pi}{2} \right)$. Its amplitude and angular frequency are (a) a, ω (b) $\frac{a}{2}, \omega$ (c) $\frac{a}{2}, \frac{\omega}{2}$ (d) $\frac{a}{2}, 2\omega$

Q 9. A particle is executing SHM of amplitude A and angular frequency ω . The average acceleration of particle for half the time period is (sailing from mean position) (a) $\frac{2A\omega^2}{\pi}$ (b) $\frac{A\omega^2}{\pi}$ (c) $\frac{3A\omega^2}{2\pi}$ (d) $\frac{A\omega^2}{2\pi}$

- Q 10. The velocities of a particle in SHM at positions x_1 and x_2 are v_1 and v_2 respectively, its time period will be -
 - (a) $2p \sqrt{(v_1^2 v_2^2)/(x_2^2 x_1^2)}$ (b) $2p \sqrt{(x_1^2 + x_2^2)/(v_2^2 - v_1^2)}$ (c) $2p \sqrt{(x_1^2 - x_2^2)/(v_2^2 - v_1^2)}$ (d) $2p \sqrt{(x_1^2 + x_2^2)/(v_2^2 + v_1^2)}$
- Q 11. In SHM, the phase difference between the displacement and acceleration is: (a) 0 (b) p/2 (c) p (d) 2 p

Answer Key

Q.1 b	Q.2 c	Q.3 b	Q.4 d	Q.5 d
Q.6 b	Q.7 c	Q.8 d	Q.9 a	Q.10 c
Q.11 c				