Class 11 Physics · Chapter 13: Oscillations

Worksheet · 20 marks · about 40 minutes · based on NCERT

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1. The amplitude of oscillation of a block on a spring is doubled, the spring and block being unchanged. The period of oscillation [1]

(a) doubles
(b) halves
(c) becomes √2 times
(d) stays the same

2. The length of the string of a simple pendulum is increased by 21%. Its period of small oscillations increases by [1]

(a) 10%
(b) 21%
(c) 4.4%
(d) 42%

3. A particle in simple harmonic motion has a period of 0.2 s. Its angular frequency is about [1]

(a) 5 rad s^{-1}
(b) 1.26 rad s^{-1}
(c) 15.7 rad s^{-1}
(d) 31.4 rad s^{-1}

4. In simple harmonic motion, the phase difference between the displacement and the acceleration of the particle is [1]

(a) π
(b) π/2
(c) zero
(d) π/4

5. The amplitude of oscillation of a block on a spring is doubled, the spring and block being unchanged. The total mechanical energy of the oscillator [1]

(a) doubles
(b) becomes four times
(c) stays the same
(d) halves

6. The diaphragm of a loudspeaker vibrates with an angular frequency of 1000π rad s^{-1}. Find its frequency in hertz and the time it takes to complete 50 vibrations. [2]

7. A ball tied to a string is whirled in a horizontal circle of radius 30 cm at 2 revolutions per second. Parallel light from a distant lamp, travelling in the plane of the circle, falls normally on a vertical wall and throws the shadow of the ball on it. Describe the motion of the shadow, giving its amplitude and period. [2]

8. A child on a swing is given a single push and then left alone. Why does the swinging eventually stop, and how can the swing be kept going at the same amplitude? [2]

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9. Name the forces on the bob of a simple pendulum displaced through an angle θ, resolve them along and perpendicular to the string, and state the role of each component. At which point of the swing is the tension in the string greatest, and why? [3]

10. A block of mass 0.5 kg on a smooth horizontal floor is attached to a spring of constant 200 N m^{-1}. It passes through its mean position with a speed of 2 m s^{-1}. Find (a) the amplitude, (b) the total energy and (c) the distance from the mean position at which its speed is 1 m s^{-1}. [3]

11. The displacement of a particle is $x(t) = A\cos(\omega t + \phi)$. Obtain its velocity and acceleration by differentiation, and state the phase of each relative to the displacement. [3]