

Model Question Paper 2

Oscillations 2

11th Standard

Physics

Reg.No. :

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Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 45

6 x 1 = 6

Part A

- 1) A force of 6.4 N stretches a vertical spring by 0.1 m. The mass that must be suspended from the spring so that it oscillates with a period of $\frac{\pi}{4}$ s is.....
 (a) $\frac{\pi}{4}$ kg (b) 1 kg (c) $\frac{1}{4}$ kg (d) 10 kg
- 2) The length of seconds pendulum at a place where $g = 9.8 \text{ m s}^{-2}$ is
 (a) 0.25 m (b) 1 m (c) 0.99 m (d) 0.50 m
- 3) A particle executes SHM with an amplitude 4 cm. At what displacement from the mean position its energy is half kinetic and half potential?
 (a) $2\sqrt{2}$ cm (b) $\sqrt{2}$ cm (c) 2 cm (d) 1 cm
- 4) A particle executes SHM along a straight line with an amplitude 'a'. PE is maximum when the displacement is
 (a) $\pm a$ (b) zero (c) $+\frac{a}{2}$ (d) $\frac{a}{\sqrt{2}}$
- 5) In the case of vibrating bodies, the path of vibration is always directed.....
 (a) away from the equilibrium position (b) towards the extreme position (c) towards the equilibrium position (d) None of the above
- 6) By definition of simple harmonic motion acceleration 'a' is equal to.....
 (a) $\omega^2 y$ (b) $-\omega^2 y$ (c) $\frac{\omega^2}{y}$ (d) $\frac{\omega^2}{y}$

Part B

5 x 2 = 10

- 7) Define the terms (i) time period, (ii) frequency and (iii) angular frequency.
- 8) Define force constant. Give its unit and dimensional formula.
- 9) What is an epoch? Give its unit.
- 10) Distinguish between linear and angular harmonic oscillator.
- 11) What is a spring factor?

Part C

3 x 3 = 9

- 12) What is forced vibration? Give an example.
- 13) What forces keep the simple pendulum in SHM?
- 14) Illustrate an example to show that resonance is disastrous sometimes?

Part D

4 x 5 = 20

- 15) A particle executing SHM has angular frequency of $\pi \text{ rad s}^{-1}$ and amplitude of 5 m. Deduce (i) time period, (ii) maximum velocity, (iii) maximum acceleration, (iv) velocity when the displacement is 3 m.
- 16) A vertical U-tube of uniform cross section water to a height of 0.3 m. show that, if water in one of the limbs is depressed and then released, the oscillations of the water column in the tube are SHM. Calculate its time period also.
- 17) A bob of a simple pendulum oscillates with an amplitude of 4 cm and time period 1 s. Find (i) length of the pendulum and (ii) velocity of the bob in the mean position.
- 18) Compare the acceleration due to gravity at two places if the time for 100 oscillations of a simple pendulum are 8 minutes 2 seconds and 8 minutes 20 seconds respectively of two places.
