



INDIAN SCHOOL DARSAIT DEPARTMENT OF PHYSICS



Subject : Physics	Chapter : Oscillations and Waves	Worksheet No. 13
Resource Person : Mrs. Jayalakshmi Ratish		Date :
Name of the Student : _____	Class & Division : XI A/B	Roll Number : _____

1. Write displacement equation respecting the following condition obtained in SHM. 1
Amplitude = 0.01m Frequency = 600Hz
2. Write any three characteristics of stationary waves. 1
3. If the period of oscillation of a spring of a mass m is 2s, find the period of mass $4m$. 1
4. All trigonometric functions are periodic, but only sine or cosine functions are used to define SHM. Why? 1
5. A simple pendulum consisting of an inextensible length 'l' and mass 'm' is oscillating in a stationary lift. The lift then accelerates upwards with a constant acceleration of 4.5 m/s^2 . Write expression for the time period of simple pendulum in two cases. Does the time period increase, decrease or remain the same, when lift is accelerated upwards? 2
6. A body executes 40 oscillations per minute. Its maximum speed is 36 cm/s. Calculate the amplitude of oscillation. 2
7. The SHM of a particle is given by the equation : 2
$$y = 3 \sin \omega t + 4 \cos \omega t$$

Find its amplitude.
8. A particle executes SHM of amplitude a , 2
(i) At what distance from the mean position is its kinetic energy equal to half its potential energy?
(ii) At what points is its speed half the maximum speed?
9. The time period of a body executing S.H.M is 1s. After how much time will its displacement be $\frac{1}{\sqrt{2}}$ of its amplitude. 2
10. A 40 gm mass produces an extension of 4 cm in a vertical spring. A mass of 200 gm is suspended at its bottom and left pulling down. Calculate the frequency of its vibration. 2
11. An incident wave is represented by $y(x, t) = 20 \sin (2x - 4t)$. Write the expression for reflected wave- 3
(a) From a rigid boundary
(b) From an open boundary
12. The length of a simple pendulum executing SHM is increased by 2.1%. What is the percentage increase in the time period of the pendulum of increased length? 3

13. A pipe 20 cm long is closed at one end. Which harmonic mode of the pipe is resonantly excited by a 430 Hz source? Will this same source be in resonance with the pipe if both ends are open? (Speed of sound = 340 m/s) 3
14. The equation of a plane progressive wave is, 3
$$y(x, t) = 10 \sin 2\pi(t - 0.005x)$$
where y & x are in cm & t in second. Calculate the amplitude, frequency, wavelength and velocity of the wave.
15. A train stands at a platform blowing a whistle of frequency 400 Hz in still air. 3
(i) What is the frequency of the whistle heard by a man running
(a) Towards the engine 10 m/s.
(b) Away from the engine at 10 m/s?
(ii) What is the speed of sound in each case?
(iii) What is the wavelength of sound received by the running man in each case?
Take speed of sound in still air = 340 m/s.