

It can also be defined as the distance between two successive crests or two successive troughs in a transverse wave.

It can also be defined as the distance between two successive compressions or two successive rarefactions in a longitudinal wave.

Wavelength of a wave depends upon the mechanical properties (nature) of medium.

The SI unit of wavelength is **meter (m)**.

6. Amplitude ( $a$ ): The maximum displacement of any vibrating particle above or below the mean position (equilibrium line) is called as amplitude.

It is a vector quantity.

The SI unit of amplitude is **meter (m)**.

7. Time period ( $T$ ): The time taken to complete one cycle (one oscillation) is called as time period.

The SI unit of time period is **seconds**.

8. Frequency ( $f$ ): The number of cycles (oscillations) made in one second is called as frequency.

Frequency depends upon source (producing wave) but does not depend upon medium through which the wave is travelling. Hence, frequency does not change when a wave travels from one medium to other (*i.e., frequency is the fundamental property of a wave*).

Mathematically, *frequency*,  $f = \frac{1}{T}$

The SI unit of frequency is **sec<sup>-1</sup> or Hertz or revolutions/sec.**

9. Wave velocity ( $v$ ): The distance travelled by a wave in one second is called as wave velocity (speed).

Wave velocity depends upon the mechanical properties (nature) of medium.

Mathematically, **wave velocity**,  $v = \frac{\lambda}{T}$

Or,  **$v = \lambda f$**

The SI unit of wave velocity is **m/s.**

10. Particle velocity ( $v_p$ ): The velocity (speed) with which a particle in a medium vibrates as a wave travels through the medium is called as particle velocity.

Mathematically, **particle velocity**,  $v_p = \frac{dy}{dt}$

The SI unit of wave velocity is **m/s.**

$$\text{particle acceleration, } a_p = \frac{d^2y}{dt^2} = \frac{dv_p}{dt} = \omega^2 y$$

The SI unit of wave acceleration is **m/s<sup>2</sup>.**

11. Phase: The physical quantity which determines the position and state of vibration of a particle with respect to its mean position is called as phase.

Its SI unit is **radian.**

12. Phase difference: The difference in phase (state of vibration) of two points (particles) at the same instant is called as phase difference.

Its SI unit is **radian.**

13. Path difference: The linear distance between two points (particles) measured along the direction of propagation of wave is called as path difference.

Its SI unit is **meter (m).**