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Chapter 1 Simple Harmonic Motion (SHM)

Oscillations :—

Introduction :- Those motions that repeat itself in a regular cycle are known as oscillation. This motion can be a periodic motion for example a sine wave - a wave with perpetual motion as in the side-to-side swing of a pendulum, or the up-and-down motion of a Spring with a weight. There is an oscillatory motion around an equilibrium point or mean value. This oscillation is also known as periodic motion.

Types of oscillations

following are the three main types of oscillations:

1. Free Oscillations :- Free oscillations take place at that time when a body vibrates with its own natural frequency. The frequency of oscillations is based on the inertial factor and Spring factor.
2. Damped Oscillations :- Most of the oscillations are damped in air or in any medium. At the time of oscillation some kind of damping force may be produced due to friction or air resistance given by the medium. Therefore, a part of the energy is dissipated in overcoming the resistive force. As a result the amplitude of oscillation decreases with time and finally becomes zero.

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3. Maintained Oscillations :- We can make the amplitude of an oscillating system constant by by feeding some energy to the system. When energy is supplied to the system to compensate for the energy lost then the amplitude will be constant. This type of oscillation are said to be maintained oscillations.

4. Forced Oscillations :- Forced oscillations occurs at that time when a vibrating body is maintained in the state of vibration by a periodic force of frequency (n) other than its natural frequency of the body. Here external force is driver and body is driven. The body is forced to vibrate with an external periodic force. The difference between the frequencies of the driver and the driven is used to find the amplitude of forced vibration. The larger the frequency difference, smaller will be the amplitude of the forced oscillations