Chapter – 13
Sound

Sound: Vibrations that travel through the air or another medium and can be heard when they reach a person's or animal's ear.

Musical Sound: The sound which produce a pleasing effect on the ear.

Noise: The sounds which produce a jarring or unpleasant effect.

Types of Sound:

(i) **Audible Sound:** Vibrations whose frequency lies between 20 Hz to 20,000 Hz (20 kHz) are heard by human ear.

(ii) **Inaudible Sound:** The sounds having frequencies above 20,000 Hz and below 20 Hz cannot be heard by the normal human ear.

- Low frequency sounds which cannot be heard are **called infrasonics**.
- High frequency sounds which cannot be heard are **called ultrasonics**.

In human beings, the vibration of the vocal cords produces sound.

Sound travels through a medium (gas, liquid or solid). It cannot travel in vacuum.

The eardrum senses the vibrations of sound. It sends vibrations to the inner ear. From there, the signal goes to the brain. That is how we hear.

Higher the frequency of vibration, the higher is the pitch, and shriller is the sound.

Unpleasant sounds are called **noise.**

Excessive or unwanted sounds lead to noise pollution. Noise pollution may pose health problems for human beings. Lack of sleep, hypertension (high bloodpressure), anxiety and many more health disorders may be caused by noise pollution. A person who is exposed to a loud sound continuously may get temporary or even permanent impairment of hearing.

Attempts should be made to minimise noise pollution. Silencing devices must be installed in air craft engines, transport vehicles, industrial machines and home appliances.

Plantation on the roadside and elsewhere can reduce noise pollution.

Amplitude: The maximum extent of vibration of the vibrating body from its mean position is known as its amplitude.

Time Period: One complete to and fro movement of the pendulum around its mean position is called one oscillation. The time taken by the vibrating particle to complete one oscillation is called time period.

Frequency:

- The number of vibrations made by the vibrating body in one second is known as its frequency.
- The SI unit of frequency is the hertz (Hz).

Characteristics of Sounds:

(i) **Loudness**: The sensation produced in the ear which enables us to distinguish between a loud and a faint sound. Larger the amplitude of vibration, the louder is the sound produced. It is proportional to square of the amplitude.

(ii) **Pitch**: The characteristics of sound which distinguishes between a shrill sound and a soft sound. Higher the frequency of vibration, higher is the pitch and shrillness.

(iii) **Quality**: Characteristic which enables us to distinguish between musical notes emitted by different musical instruments or voices even though they have the same pitch and loudness.