

**MIND**

- Sound is a mechanical energy which produces sensation of hearing. Sound is produced due to vibration of different

- Sound wave propagates as compressions & rarefactions in the medium. Sound waves are longitudinal waves.

**Characteristics of Sound**

- Loudness or intensity.
- Pitch or frequency.
- Quality or timbre.

**Reflection of Sound**

- An **Echo** is the phenomenon of repetition of sound of a source by reflection from an obstacle.
- **Multiple echoes** are heard when sound is repeatedly reflected from a number of obstacles at suitable distance.
- Megaphone, stethoscope ear trumpet, hearing aid etc are based on phenomenon of multiple reflection of sound.
- Reverberation is the phenomenon of persistence of audible sound after the source has stopped emitting sound. Reverberation is reduced by carpeting the floor, upholstering furniture & covering the walls with some absorbing material like curtains etc.

**Range of Frequencies**

- Audible range of hearing of average human being is in the frequency range of 20Hz to 20 KHz.
- Infrasound has a frequency below 20Hz. Ultrasound has a frequency above 20 kHz.
- Ultrasound finds application in industry, medical service & communications.

**Characteristics of a Sound Wave**

Sound waves are produced due to variations in pressure & density of the medium.

- **Compression** is the portion of the medium where a temporary increase in volume & a decrease in density takes place when a sound wave passes through the medium.
- **Rarefaction** is the portion of the medium where a temporary increase in volume & consequently a decrease in density takes place when sound wave passes through the medium.
- **Crest** is the portion of the medium where the density (or pressure) has a value larger than its average value.
- **Trough** is the portion of the medium where the density (or pressure) has a value smaller than the average value.
- **Amplitude** is the magnitude of the maximum disturbance in the medium on either side of the mean position.
- **Oscillation** is the change in density (or pressure) from maximum value to the minimum value and again to the maximum value.
- **Frequency** enables us to know as to how many times a particular event occur in a given time.
- **Time Period** is the time taken for one complete oscillation in density (or pressure) of the medium.
- **Wavelength** is the distance between two consecutive compressions or two consecutive rarefactions.

**Human Ear**

- **Outer ear** collects sound waves.
- **Middle ear** amplifies the sound waves.
- **Inner ear** converts the amplified sound energy into electrical energy & conveys to the brain as nerve impulse for interpretation.