

Sound Waves.

The energy to which the human ears are sensitive is known as sound. In general all types of waves are produced in an elastic material medium, Irrespective of whether these are heard or not are known as sound.

According to their frequencies, waves are divided into three categories:

(1) Audible or sound waves: Range 20 Hz to 20 KHz. These are generated by vibrating bodies such as vocal cords, stretched strings or membrane.

(2) Infrasonic waves: Frequency lie below 20 Hz.

Example: waves produced during earth quake, ocean waves etc.

(3) Ultrasonic waves: Frequency greater than 20 KHz. Human ear cannot detect these waves, certain creatures such as mosquito, dog and bat show response to these. As velocity of sound in air is 332 m/sec so the wavelength of ultrasonics $\lambda < 1.66$ cm and for infrasonics $\lambda > 16.6$ m.

Note: Supersonic speed: An object moving with a speed greater than the speed of sound is said to move with a supersonic speed.

□ Mach number: It is the ratio of velocity of source to the velocity of sound.

$$\text{Mach Number} = \frac{\text{Velocity of source}}{\text{Velocity of sound}} .$$

□ Difference between sound and light waves:

- (i) For propagation of sound wave material medium is required but no material medium is required for light waves.
- (ii) Sound waves are longitudinal but light waves are transverse.
- (iii) Wavelength of sound waves ranges from 1.65 cm to 16.5 meter and for light it ranges from 4000 Å to 2000 Å.