# SOUND

# RANGE OF HEARING, HEARING AID

### Range of hearing (audible range)

All vibrating bodies produce waves. Each wave has its own frequency. The frequency of a wave is equal to the frequency of the vibrating body producing sound. When a woman speaks, the waves produced by the vocal cords in her throat have different frequency than the frequency of the waves produced by the vocal cords of a man. Can human ears hear all the frequencies produced by the vibrating bodies ? The answer is No. In fact, normal human ears can hear only those waves whose frequency lies between 20 Hz and 20,000 Hz. The waves having frequency between 20 Hz and 20,000 Hz are known as sound waves. Thus, the audible range of frequency is 20 Hz to 20,000 Hz.

The waves having frequency less than 20 Hz and greater than 20,000 Hz cannot be heard by human ear.

### Infrasonic or infrasound

The waves of frequency less than 20 Hz are known as infrasonic waves.

The infrasonic waves are produced by large vibrating bodies.

For example, infrasonic waves are produced by the vibration of the earth's surface during the earthquake. Some animals like elephants, rhinoceroses and whales etc. also produce infrasonic waves. These waves are not audible to a human ear.

It has been observed that animals' behavior becomes unusual just before the tremor is felt. This is because the animals have the ability to detect infrasonic waves produced at the time of tremor.

#### CLASS 9

#### Ultrasonics or ultrasound

The waves of frequency greater than 20,000 Hz are known as ultrasonic waves or ultrasound. These waves are not audible to a human ear but they can be heard by animals and birds.

Bats can produce ultrasonic waves by flapping their wings. They can also detect these waves. The ultrasonic waves produced by the bats after reflection from the obstacles like buildings guide them to remain away from the obstacles during their flights. Hence, they can fly during night without hitting the obstacles. Bats also catch their prey during night with the help of ultrasonic waves. The ultrasonic waves produced by a bat spread out. These waves after reflecting from a prey sayan insect reach the bat. Hence, the bat can easily locate its prey

### Dolphins also produce ultrasonic waves.

They can also detect the ultrasonic waves. They catch their prey like a fish due to their ability to detect the ultrasonic waves reaching them after reflecting from a fish.

