

While during rarefaction ear drum moves outwards. Thus, ear drum starts vibrating back and forth.

- These vibrations are increased by three bones and middle ear transmits these amplified pressure variations received from sound waves to inner ear.
- In the inner ear the pressure variations are turned into electric signals by the cochlea.
- These electric signals are sent to the brain via auditory nerve and the brain interprets them as sound.

Working of Human ear

Pinna → Ear canal → Ear drum → Hammer → Anvil → Stirrup → Oval window → Cochlea → Auditory nerve → Brain

QUESTIONS

VERY SHORT ANSWER QUESTIONS

1. Why sound waves are called mechanical waves ?
2. Which characteristic of sound determine : (a) Pitch, (b) Loudness ?
3. Write wave formula for velocity of sound.
4. Write the hearing range of human being.
5. What is sound ?

LONG ANSWER QUESTIONS

1. Name the two types of waves which can be generated in a slinky.
2. What is SI unit of frequency ? Write its bigger unit also.
3. How is sound produced ?
4. In which medium sound travels fastest : air, water or steel ?
5. Name two devices which work on the reflection of sound.
6. State two laws of reflection of sound.
7. Define the term wavelength & frequency.
8. Define the term time period and amplitude.

LONG ANSWER QUESTIONS

1. Explain why, the flash of lightning reaches us first and the sound of thunder is heard a little later ?
2. What is meant by supersonic speed ?
3. Why are the ceiling of concert halls made curved ?
4. What is reverberation ? How can reverberation in a big hall be reduced ?
5. What is echo ? How is echo formed ? How thunder of clouds is formed ?
6. Write any three applications of ultrasound.
7. Explain how bats use ultrasound to catch the prey.
8. What is SONAR ? Explain its working. Give its uses.
9. A wave is moving in air with a velocity of 340 m/s. Calculate the wavelength if its frequency is :

(a) 512 vibrations per second

(b) 100 Hz.

[Ans: (a) 0.66 m (b) 3.4 m]

10. A sonar station picks up a return signal after 3 seconds. How far away is the object ? [Speed of sound in water = 1440 m/s] [Ans: 2160 m]
11. A stone is dropped from the top of a tower 500 m high into a pond of water at the base of tower. When is the splash heard at the top ? Given $g = 10 \text{ ms}^{-2}$ and speed of sound = 340 ms^{-1} . [Ans: 11.475]

[Hint : Time taken by stone to reach at pond, $t = ?$, Use $s = ut + \frac{1}{2}gt^2$, $500 = 0 + \frac{1}{2} \times 10t^2$; so, $t^2 = 100$ or $t = 10 \text{ sec.}$]

OBJECTIVE TYPE QUESTIONS

- A sound wave has a frequency of 1KHz and wavelength 25cm, to travel 2.2km it takes.**
 - $2\frac{3}{7}$ sec = $\frac{17}{7}$ sec
 - $80\frac{2}{5}$ min. = $\frac{402}{5}$ min.
 - 5/4 min.
 - $\frac{44}{5}$
- A body produces sound only if it is**
 - made of steel
 - made of glass
 - made of iron
 - vibrating
- Sound travels fastest in**
 - air
 - vacuum
 - steel
 - water
- A sound produces 50 crests and 50 troughs in 0.5 seconds. What is the frequency of the wave?**
 - 50 Hz
 - 100 Hz
 - 150 Hz
 - 200 Hz
- The voice of a friend is recognised by its**
 - Pitch
 - Quality
 - Velocity
 - Intensity
- A 440 Hz sound wave travels with a speed of 340 ms^{-1} . The wavelength of the wave is**
 - 1.5×10^5 m
 - 0.77 m
 - 1.3 m
 - 1.1 m
- Earthquake produces which kind of sound before the main shock begins?**
 - Ultrasound
 - Infra sound
 - Audible Sound
 - None of these
- A mechanical wave will be transverse or longitudinal depending on :**
 - the nature of medium
 - the whole of excitation
 - frequency
 - amplitude
- Which of the following can travel through vacuum?**
 - Light waves
 - Heat waves
 - X-rays
 - Sound waves
- The velocity of sound is affected by change in**
 - Temperature
 - Medium
 - Pressure
 - Wavelength