NCERT Exemplar Solutions For Class 8

Science (Physics)

Chapter 13- Sound

Multiple Choice Questions

1. A list of mediums is given below.

(i) wood

(ii) water

(iii) air

(iv) vacuum

In which of these mediums can sound travel?

(a) i & ii only

(b) i, ii & iii only

(c) iii & iv only

(d) ii, iii & iv only

Ans: (b) i, ii & iii only.

Sound can travel only in wood, air and water medium.

2. The loudness of sound depends on:

(a) its amplitude.

(b) its frequency

(c) its time period.

(d) its speed.

Ans: (a) its amplitude

The loudness of sound is directly proportional to the amplitude. High amplitude results in high sound.

3. Which of the following statements are correct?

(i) Sound is produced by vibrations.

(ii) Sound requires a medium for propagation.

(iii) Light and sound both require a medium for propagation.

(iv) Sound travels slower than light.

(a) i & ii only

(b) i, ii & iii only

(c) ii, iii & iv only

(d) i, ii & iv only

Ans: (d) i, ii & iv only

Sound and light are two different entities.

4. An object is vibrating at 50 hertz. What is its time period?

(a) 0.02 s

(b) 2 s

(c) 0.2 s

(d) 20.0 s

Ans: (a) 0.02 s

$$50\ Hertz = \frac{1}{T}$$

$$T = \frac{1}{50}$$

$$T = 0.02s$$

5. In order to reduce the loudness of a sound we have to

(a) decrease its frequency of vibration of the sound.

(b) increase its frequency of vibration of the sound.

(c) decrease its amplitude of vibration of the sound.

(d) increase its amplitude of vibration of the sound.

Ans: (c) Decrease its amplitude of vibration of the sound.

Loudness is directly proportional to the amplitude. High amplitude results in high sound

6. Loudness of sound is measured in units of

(a) Decibel (dB)

(b) Hertz (Hz)

(c) Metre (m)

(d) metre/second (m/s)

Ans: (a) Decibel (dB)

The loudness of sound is proportional to the square of the vibration amplitude and is measured in decibels (dB).

7. The loudness of sound is determined by the

(a) Amplitude of vibration

(b) Ratio of amplitude and frequency of vibration

(c) Frequency of vibration

(d) Product of amplitude and frequency of vibration

Ans: Amplitude of vibration

The loudness of sound is set by its amplitude. The amplitude of a faint sound is small, however, the amplitude of a loud sound is larger.

8. 1 hertz is equal to

(a) 1 vibration per minute

(b) 10 vibrations per minute

(c) 60 vibrations per minute

(d) 600 vibrations per minute

Ans: (c) 60 vibrations per minute

One hertz is one cycle per second, hence one hertz equals 60 vibrations each minute.

9. Pitch of the sound is determined by its

(a) Frequency

(b) Amplitude

(c) Speed

(d) Loudness

Ans: Frequency

The frequency of a sound determines its pitch.

10. Ultrasound has frequency of vibration

(a) Between 20 and 20,000 Hz

(b) Below 20 Hz

(c) Above 20,000 Hz

(d) Between 500 and 10,000 Hz

Ans: Above 20,000 Hz

The term "Ultrasound" refers to sound with a frequency greater than that of the human auditory range. The maximum frequency of human audible sound is 20000 Hz.

Very Short Answer Question

11. Lightning can be seen the moment it occurs. Paheli observes lightning in her area. She hears the sound 5 s after she observed lightning. How far is she from the place where lightning occurs? (speed of sound = 330 m/s).

Ans: $\text{Distance} = 330 \text{ms} \times 5\text{s} = 1650\text{m}$

12. Does any part of our body vibrate when we speak? Name the part.

Ans: When we talk, our vocal cords and larynx vibrate.

13. Boojho saw a cracker burst at night at a distance from his house. He heard the sound of the cracker a little later after seeing the cracker burst. Give reason for the delay in hearing the sound.

Ans: The speed of light is greater than the speed of sound. As a result, Boojho notices the light before hearing the cracker.

14. When we hear a sound, does any part of our body vibrate? Name the part.

Ans: Our eardrum vibrates whenever we hear a sound.

15. Name two musical instruments which produce sound by vibrating strings?

Ans: Guitar and Veena

Short Answer Questions

16. A simple pendulum makes 10 oscillations in 20 seconds. What is the time period and frequency of its oscillation?

Ans:

Time taken to make 1 oscillation $= \dfrac{20}{10}$ s $= 2$ s

Time period $= 2$ s

Frequency $= \dfrac{1}{t} = \dfrac{1}{2} = 0.5$ Hz

17. We have learnt that vibration is necessary for producing sound. Explain why the sound produced by every vibrating body cannot be heard by us?

Ans: Every frequency is inaudible to the human ear. Frequencies between 20hz and 2000hz only can be heard. As a result, we cannot hear every sound made by a few vibrations.

18. Suppose a stick is struck against a frying pan in vacuum. Will the frying pan vibrate? Will we be able to hear the sound? Explain.

Ans: Doing vibration is the nature of solids. Therefore frying pan will also vibrate but due to the presence of a vacuum, we won't be able to hear it.

19. Two astronauts are floating close to each other in space. Can they talk to each other without using any special device? Give reasons.

Ans: No, they won't be able to hear one other because sound demands a medium to travel. If they do not have a medium, hearing each other won't be possible for them.

20. List three sources of noise pollution in your locality.

Ans: Vehicles, Loudspeakers, Industrial sirens.

Long Answer Questions

21. We have a stringed musical instrument. The string is plucked in the middle first with a force of greater magnitude and then with a force of smaller magnitude. In which case would the instrument produce a louder sound?

Ans: Sound energy is released when a guitar string is plucked. The melody we hear is caused by the string returning to its original place. Harmonic motion is the movement of an oscillating body. A sinusoidal wave would be produced if the position, velocity, or acceleration of an oscillating body were graphed against time. The amplitude of a wave is determined by the vibration of a source. Through its vibration, it sends energy into the medium. A bigger amplitude equates to a more intense vibration. The molecules are moving more quickly back and forth.

As a result, when the string is plucked in the centre with a greater force, the sound is louder.

22. How is sound produced and how is it transmitted and heard by us?

Ans: Sound is a type of energy that is created and conveyed by vibrating matter. Waves of sound travel through space. When sound travels through matter (solid, liquid, or gas), the molecules in the matter move back and forth along the wave's direction.. This movement is referred to as a vibration. As sound waves travel,

molecules are compressed in certain regions (compression) and stretched out in others (spread out) (rarefaction). When a loud sound is perceived, it is because many molecules have been violently vibrated. A quiet sound is produced by vibrating fewer molecules with less force.

Because the molecules of a solid are closer together, sound travels faster through solids than through liquids and gases. Because the molecules of a gas are so far apart, sound travels the slowest through them. Sound cannot travel in a vacuum because there is no matter for it to go through.

23. An alarm bell is kept inside a vessel as shown in Fig. 13.1. A person standing close to it can distinctly hear the sound of alarm. Now if the air inside the vessel is removed completely how will the loudness of alarm get affected for the same person?
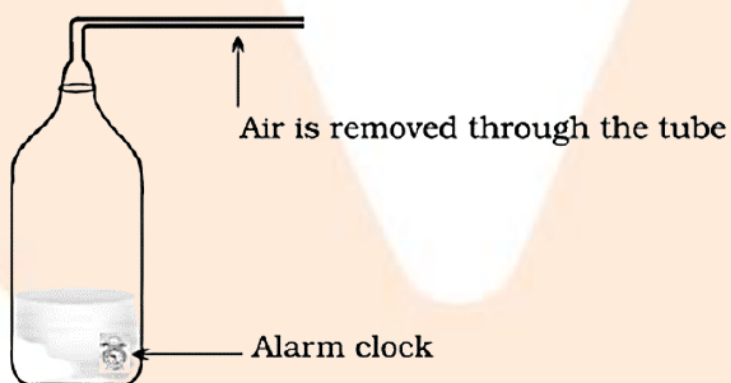

Fig. 13.1

Ans: Until air was introduced in the vessel, the required medium for sound propagation was present. However, when the air in the jar is removed, a vacuum is

created. Because sound cannot travel in a vacuum, the man standing next to the vessel will not hear the sound of the bell.

24. The townhall building is situated close to Boojho's house. There is a clock on the top of the townhall building which rings the bell every hour. Boojho has noticed that the sound of the clock appears to be much clearer at night. Explain.

Ans: There are various vibrations in the air during the day. These vibrations reduce the loudness, pitch, and speed of the clock's bell. As a result, Boojho hears the sound of the watch's bell considerably more clearly at night than during the day.

25. Suggest three measures to limit noise pollution in your locality

Ans: Some key measurements are included below:

(i) We should prevent superfluous horn blowing.

(ii) Better silencers should be installed on the cars.

(iii) Trees are the most effective polluter-reducers. Planting trees alongside the road will also assist.