

Sound class8 living science

A. Choose the most appropriate answer.

- For oscillating pendulum of fixed length which of the following is true?
 - Frequency depends on amplitude
 - Frequency and time period are not related
 - Time period depends on amplitude of oscillation,
 - Frequency and time period do not depend on amplitude
- The quality of sound produced by a tuning fork is different from that produced by a musical instrument because of difference in
 - amplitude, b. frequency. c. Harmonics d. none of these
- Sound can travel through
 - solids only b. liquids only c. Gases only d. all of these
- An object vibrates with a frequency of 15 Hz. Which of the following is true?
 - It produces sound which we can hear. b. It does not produce sound.
 - It produces sound which we cannot hear. d. It produces sound which we can hear if we strain our ears.
- In which medium sound travel fastest?
 - air b. water c. steel d. Vacuum
- Which of the following characteristics of sound depends on the amplitude of vibrations?
 - speed b. pitch c. loudness d. quality
- Sound of frequency 320 Hz is of lower pitch than sound of frequency
 - 10 Hz. b. 180 Hz. c. 256 Hz. d. 512 Hz.
- Sound of which of the following frequency can you hear?
 - 5 Hz b. 15 Hz c. 500 Hz d. 50,000 Hz
- Which of these is expected to be the best absorber of sound?
 - iron b. wood c. wool d. cemented wall

Ans. 1. d 2. b 3. d 4. c 5. c 6. c 7. d 8. c 9. c

B. VERY SHORT-ANSWER QUESTIONS: Give one-word answers.

- Sound is produced by -----
- Name the instrument used in the laboratory to produce sound of a fixed frequency
- What does loudness of sound depend on?
- Give the term for 'number of vibrations per second'.
- Frequency is measured in -----
- The pitch of sound depends on time period of vibration. True or false?
- In general, which sound has greater frequency—a bird singing or a man singing?
- Most vibrating objects generate sound of several frequencies simultaneously. True or false?
- The quality of two sounds with the same fundamental frequency differs because of the number and relative loudness of the -----.
- The sound produced by a tuning fork has no harmonics. True or false?
- Flute ----- a type of musical instrument.
- The pitch of the sound produced in a guitar can be altered by reducing the vibrating length of the wire. True or false?

13. What is the name given to sound produced by irregular vibrations?
14. In our ears, the vibrations in the air are picked up by the ----- ear.
15. What travels faster— light or sound?
16. The two kinds of sounds we cannot hear are ----- and -----
17. A soft board will (reflect/ absorb) most of the sound falling on it.
- 18, What is the unit in which loudness of sound is measured?
19. Prolonged exposure to noise louder than ----- dB can lead to permanent hearing damage.
20. Which surfaces reflect sound better—hard or soft?

Answer : 1. vibrations 2. Tuning fork 3. Amplitude of vibration 4. Frequency
5. Hertz (Hz) 6 False 7. A bird singing 8. True
9. Harmonics 10. True 11. wind 12. True
13. Noise 14. outer 15. light 16. infrasonic, ultrasonic
17. absorb 18. decibel (dB) 19. 70 20. hard surfaces

C. 1. How is sound produced?

Ans: Sound is produced by rapid to-and-fro movements called vibrations.

2. Distinguish between infrasonic and ultrasonic.

Ans: Low frequency sounds below 20 hertz which we cannot hear are called infrasonic, whereas high frequency sounds above 20,000 hertz which also cannot be heard by us are called ultrasonic.

3. What do you mean by time period of a vibrating object?

Ans: The time taken for one complete vibration or oscillation is called its time period.

4. What is the 'amplitude' of a vibrating object?

Ans: The maximum distance to which an oscillating or vibrating object moves from its central position is called amplitude. The loudness of sound depends on the amplitude of vibration.

5. What is the 'frequency' of a vibrating object? How is it related to shrillness of sound?

Ans: Sound is produced by rapid to-and-fro movements, called vibrations or oscillations. The number of oscillations per second is called frequency of oscillating body. The SI unit of frequency is hertz (Hz). The higher the frequency, the more shrill is the sound.

6. Why do women have shriller voices than men?

Ans: Women have shorter vocal cords (about 15 mm long) than men (about 20 mm long). Thus, the frequency of women's voice is higher than that of men and their voice is found to be shrill.

D. D. SHORT-ANSWER QUESTIONS (TYPE II): Answer in about 30 words.

1. In what way does loudness of sound depend on amplitude? If the amplitude is increased three times, by how much does the loudness increase?

Ans: If we strike a drum softly, it produces a soft sound. If you strike it hard, its skin vibrates with greater amplitude and a louder sound is produced. This shows that loudness of the sound produced by a vibrating object depends on the amplitude of vibration. Loudness is proportional to the square of the amplitude. Thus, if the amplitude is increased by three times, the loudness increases by nine times.

2. Ramesh measured the time gap between lightning and thunder and found that it was 3 seconds. Assuming light cover the distance instantly, what is the distance of cloud from Ramesh

Ans: We know that sound takes about 3 seconds to travel 1 km. Thus, assuming light covers the distance instantly, the distance of the clouds from Ramesh is 1 km.

3. Why can you not hear the echo if you stand 10 m away from a wall and shout towards it?

Ans: To hear the echo we need to stand at least 17 m away from the object. This is because, distance travelled by sound in $\frac{1}{10}$ second = speed \times time = $340 \text{ m/s} \times (\frac{1}{10}) \text{ s} = 34 \text{ m}$.

Thus, we cannot hear the echo if you stand 10 m away from a wall and shout towards it.

4. How is sound produced by our throat?

Ans: Humans produce sound in the larynx due to vibrations in the vocal cords. Vocal cords are folds of tissues with a slit-like opening between them. When we speak, air passes through the opening and the vocal cords vibrate to produce sound.

5. Name the three types of musical instruments. How is sound produced by each?

Ans: There are three types of musical instruments. They are:

(a) Stringed instruments: Sitar, guitar, violin, sarod, etc., are stringed instruments. They use vibrations in metal wires to produce sound. The frequency of sound is varied by varying the length of the vibrating wire.

(b) Wind instruments: Flute, shehnai, etc., are wind instruments. They use vibrations in air columns to produce sound.

(c) Percussion instruments: Drum, tabla, mridangam, etc., are percussion instruments. They have a stretched skin whose vibrations produce sound. Loudness is increased by striking the skin harder. The pitch is increased by stretching the skin more.

6. What do you mean by noise pollution? What are the main causes of noise pollution?

Ans: Too much noise in our surroundings produced by irregular vibrations is harmful to us and is referred to as noise pollution. The main causes of noise pollution are:

(i) Horn blown by Traffic on the road (ii) noise produced by machines in factories

(iii) In our house noise is caused by mixers and grinders, vacuum cleaners, air coolers, etc

(iv) Loud music produced by speaker

7. List the four ill effects of noise pollution on human health?

Ans: Noise can affect our well-being in a number of ways.

(i) Exposure to sudden high noise level (e.g. explosion) can cause **permanent hearing loss due to rupture of eardrum**.

(ii) Prolonged exposure to noise with a volume more than 70 decibels lead to gradual hearing loss

(iii) High noise levels can also lead to nervous tension and increase of blood pressure.

(iv) High noise levels because sleep sickness and person need to take sleeping pills.

8. List three methods of controlling noise pollution?

Ans: are: (i) Planning land use to reduce noise; for example, making tree-lined buffer zones between residential colonies and roads with heavy traffic.

(ii) Reducing noise emissions by developing low-noise products, for example, better silencers for automobiles.

(iii) Measures such as screens and enclosures around machinery to obstruct the path of noise. This will help people working in and living near factories.

E. 1. Explain what do you mean by quality of sound? What is it determined by?

Ans: The characteristic of sound that help us to distinguish between two or more sounds similar pitch and loudness.

If the vibrating strings of a sitar and a guitar are adjusted to give the same pitch and loudness, we can still distinguish their sound from one another. This is due to its quality. It is due to the fact that most vibrating objects simultaneously generate sounds of other frequencies.

The quality of a sound is determined by frequencies present in it and their relative loudness.

2. Explain how the sound produced by vibrating body reaches to our ear? What happens after it enters the ear.

Ans: A vibrating object causes air molecules to vibrate. This creates regular compression and rarefaction in till sound reach to ear.

When sound vibrations reach our ear, pinna collects the sound wave and pass into the ear canal.

These waves then strike the eardrum, which starts vibrating with the same frequency.

This causes three bones hammer, anvil and stirrup of the middle ear to vibrate.

The amplified sound wave then reaches to inner ear where cochlea converts these sound waves into electrical signals.

The auditory nerve takes the signal to the brain and brain interprets sound

3. Describe an experiment to show that sound can travel through liquid?

Ans: Experiment to show that sound can travel through liquids:

- ✓ Let us take a tub filled with water. Hold a bell in one hand and dip it in water.
- ✓ Keep one of your ears (caution: water should not enter your ear) gently on the surface of water and ring the bell inside the water.
- ✓ We will be able to hear the sound clearly. This shows that sound can travel through liquids also.

4. Describe an experiment to show that sound cannot travel through vacuum?

Ans: Experiment to show that sound cannot travel through vacuum:

- ✓ Let us take a container with a tight closing lid.
- ✓ Make a hole at the bottom of the container.
- ✓ Connect a vacuum pump to this hole with a rubber tube.
- ✓ The vacuum pump is used to extract air from the container.
- ✓ Put a cell phone inside the container and close it with the lid.
- ✓ Call the number of the cell phone so that it rings.
- ✓ We can hear the sound clearly.
- ✓ Now, start the vacuum pump and extract the air from the container.
- ✓ Call the number of the cell phone again.
- ✓ We cannot hear the sound now. This experiment proves that sound cannot travel through vacuum.

HOTS Questions

1. An explosion occurs on the moon. Will it be (a) seen (b) heard on the earth instantly or after some time?

Ans: If an explosion occurs on the moon, it will be seen after approximately 1.2 second, but not heard because there is no air on moon.

2. In the game hide and seek, we can be blind-folded person guess which player is closest to him?

Ans: In the game hide and seek, the blind-folded person can guess which player is closest to him by hearing sound created by the player.