



Exercise Questions

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1. Choose the correct answer.

Sound can travel through

- (a) gases only
- (b) solids only
- (c) liquids only
- (d) solids, liquids and gases **Soln:**

The answer is (d) solids, liquids and gases **Explanation:**

For the sound to travel, it requires a medium. Solids, liquids and gases provide a medium through which sound can travel.

2. Voice of which of the following is likely to have a minimum frequency?

- (a) Baby girl
- (b) Baby boy
- (c) A man (d) A woman **Soln:**

The answer is (c) A man

Explanation:

When compared to the voices of a baby boy, baby girl, and woman, the voice of a man has a lower pitch. As the pitch of a man is low, which is proportional to the frequency of a sound, the man's voice is of minimum frequency as compared with others.

3. In the following statements, tick 'T' against those which are true and 'F' against those which are false.

- (a) Sound cannot travel in a vacuum. (T/F)
- (b) The number of oscillations per second of a vibrating object is called its time period. (T/F)
- (c) If the amplitude of the vibration is large, the sound is feeble. (T/F)
- (d) For human ears, the audible range is 20 Hz to 20,000 Hz. (T/F)
- (e) The lower the frequency of vibration, the higher the pitch. (T/F)
- (f) Unwanted or unpleasant sound is termed as music. (T/F) (g) Noise pollution may cause partial hearing impairment. (T/F) **Soln:**

a) True – A medium is required for sound to travel



- b) False – A vibrating object whose number of oscillations per second is known as its frequency. The time taken to complete one oscillation is called a time period.
- c) False – The square of the amplitude of vibration is proportional to the loudness of sound. Sound is loud when the amplitude of vibration is large. For a feeble sound, the amplitude is small.
- d) True – Sounds of all frequencies are not audible to human ears. The range of frequencies which are audible to human ears is between 20 Hz and 20,000 Hz. Sounds outside these frequencies are not audible to human ears.
- e) False – Higher the frequency, the higher the pitch of the sound, as the pitch is proportional to its frequency. For highpitched sounds, its vibrating frequency is high, and for low-pitched sounds, its vibrating frequency is small.
- f) False – Music is a melodious and pleasing sound which is pleasant to hear. Noises are unpleasant sounds.
- g) True – Noises are unwanted and unpleasant sounds which cause temporary hearing impairment when heard continuously for a long period of time.

4. Fill in the blanks with suitable words.

- (a) Time taken by an object to complete one oscillation is called _____.
- (b) Loudness is determined by the _____ of vibration.
- (c) The unit of frequency is _____.
- (d) Unwanted sound is called _____.
- (e) The shrillness of a sound is determined by the _____ of vibration.

Soln:

- (a) Time taken by an object to complete one oscillation is called the **time period**.
- (b) Loudness is determined by the **amplitude** of vibration.
- (c) The unit of frequency is **hertz**.
- (d) Unwanted sound is called **noise**.
- (e) The shrillness of a sound is determined by the **frequency** of vibration.

5. A pendulum oscillates 40 times in 4 seconds. Find its time period and frequency.

Soln:

The number of oscillations per second of the vibrating body is known as the frequency of oscillation.

Frequency = Total number of oscillations



Total time taken

$$= 50/5$$

$$= 10 \text{ Hz}$$

The time period is the time taken to complete one oscillation. It is also the inverse of frequency.

$$\text{Time period} = 1/\text{Oscillating frequency}$$

$$= 1/10$$

$$= 0.1 \text{ s} \therefore \text{frequency}$$

$$= 10 \text{ Hz}$$

$$\text{Time period} = 0.1 \text{ s}$$

6. The sound from a mosquito is produced when it vibrates its wings at an average rate of 500 vibrations per second. What is the time period of the vibration?

Soln:

The time period is defined as the time taken to complete one oscillation. It is also the inverse of frequency.

$$\text{Time period} = 1$$

Oscillation frequency

$$\text{Oscillation frequency} = 500 \text{ Hz}$$

$$\text{The time period of the vibration} = 1/500 = 0.002 \text{ s}$$

7. Identify the part which vibrates to produce sound in the following instruments.

(a) **Dholak**

(b) **Sitar**

(c) **Flute Soln:**

a) Dholak – It consists of a head which is a stretched membrane. Vibrations are set into these stretched strings. When the head is beaten gently, these vibrations produce sound, and thus Dholak produces sound.

b) Sitar – It is a musical instrument. Stretched strings are part of it. Vibrations are produced when the string is plucked when played. These vibrations produce sound, and thus sitar produces sound.

c) Flute – It's an instrument which has holes in it. It is a hollow pipe. The air inside the pipe is set into vibration when air is blown over its mouth, and this produces a pleasant sound.



8. What is the difference between noise and music? Can music become noise sometimes?

Soln:

Music is a sound which is pleasant to hear. Sounds from flutes, pianos and violins are pleasant to hear.

Noises are sounds which are unpleasant to hear.

Sounds which are unpleasant to hear are:

- (a) Sounds from bus horns and truck horns.
- (b) Electrical generator sounds.
- (c) Gunshot sounds.
- (d) Jackhammer sounds

Yes, sometimes, when the music is played at high volumes, it also becomes noise.

9. List sources of noise pollution in your surroundings.

Soln:

Noise pollution sources in our surroundings are listed below:

- (a) Bus and car horns
- (b) Firecrackers and loudspeakers
- (c) High volumes in televisions and transistors
- (d) Mixers at home
- e) Sirens from factories

10. Explain in what way noise pollution is harmful to humans.

Soln:

A number of health issues are associated with noise pollution. They are as follows:

- (a) Stress
- (b) Headache
- (c) Hearing loss
- (d) Insomnia
- (e) Hypertension



11. Your parents are going to buy a house. They have been offered one on the roadside and another three lanes away from the roadside. Which house would you suggest your parents should buy? Explain your answer.

Soln:

It is better to buy the house which is three lanes away from the roadside as there will be less noise as compared to the one on the main road. The noises can be caused by vehicles; as the distance between the source and the listener increases, the intensity of the noise decreases. So it's better to buy the house which is three lanes away from the roadside.

12. Sketch the larynx and explain its function in your own words.

Soln:



When we swallow something, the larynx moves. There are two vocal cords inside the larynx. The air passes through a small gap which is present in between them. The lungs force the air into the gap when we speak, and this vibrates the vocal cord, due to which sound is produced.

13. Lightning and thunder take place in the sky at the same time and at the same distance from us. Lightning is seen earlier, and thunder is heard later. Can you explain why?

Soln:

The speed of light is more than the speed of sound. Thus, lightning is seen first, which is accompanied by thunder later.