

CHAPTER SOUND

Exercise A- Multiple Chose Question

Question 1

Sound can travel through

- a) gases only
- b) solids only
- c) liquids only
- d) solids, liquids and gases

Answer

d) solids, liquids and gases

Reason — Sounds needs a medium to travel. Solids, liquids and gases provide a medium through which sound can travel.

Question 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

Answer

c) A man

Reason — The frequency of a sound is proportional to its pitch. An adult man's voice has a lower pitch than the voices of a baby boy, a baby girl, and a woman.

Exercise B- True or False

Question 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 is 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)

Answer

(a) Sound cannot travel in a vacuum. — True

(b) The number of oscillations per second of a vibrating object is called its time period.
— False

Reason — The number of oscillations per second of a vibrating object is called its frequency.

(c) If the amplitude of the vibration is large, the sound is feeble. — False

Reason — If the amplitude of the vibration is large, the sound is loud.



- (d) For human ears, the audible range is 20 Hz to 20,000 Hz. — True
(e) The lower the frequency of vibration, the higher is the pitch. — False
Reason — The lower the frequency of vibration, the lower is the pitch.
(f) Unwanted or unpleasant sound is termed as music. — False
Reason — Unwanted or unpleasant sound is termed as noise.
(g) Noise pollution may cause partial hearing impairment. — True

Exercise C- Fill in the blanks

Question 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) Shrillness of a sound is determined by the of vibration.

Answer

- (a) Time taken by an object to complete one oscillation is called 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.

Exercise D- Numerical

Question 5

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

Answer

Given,

Total number of oscillations = 40

Total time taken = 4 s

We know,

Frequency = Total number of oscillations/Total time taken

Substituting we get,

Frequency = $40/4 = 10$ Hz

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

Substituting we get,

Time period = $1/10 = 0.1$ s

Hence, frequency = 10 Hz and time period = 0.1 s.

Question 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?

Answer

Given,

Total number of vibrations = 500

Total time taken = 1 s



We know,

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

And

Frequency = Total number of oscillations/Total time taken

Hence,

Time period = Total time taken/Total number of oscillations

Substituting we get,

Time period = $1/500 = 0.002$ s

So, time period = 0.002 s.

Exercise E- Short and Long type Question

Question 7

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

- (a) Dholak
- (b) Sitar
- (c) Flute

Answer

- (a) Dholak — Stretched membrane.
- (b) Sitar — Stretched strings
- (c) Flute — Air column

Question 8

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

Answer

Noise	Music
Noises are sounds which are unpleasant to hear.	Musical sound is one which is pleasing to the ear.
Example: Horns of buses and trucks.	Example: Sounds from flutes, pianos and violins.

Yes, when music is played at very high volume, it becomes noise.

Question 9

List sources of noise pollution in your surroundings.

Answer

Sources of noise pollution are:

1. Horn of vehicles
2. Explosions including bursting of crackers
3. Sounds from machines, loudspeakers
4. Television, transistor and radio at high volumes
5. Desert coolers, air conditioners

Question 10

Explain in what way noise pollution is harmful to humans.

Answer

Presence of excessive noise in the surrounding may cause many health related problems like:

1. Lack of sleep
2. Hypertension
3. High blood pressure
4. Anxiety
5. Temporary or permanent impairment of hearing.

Question 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.

Answer

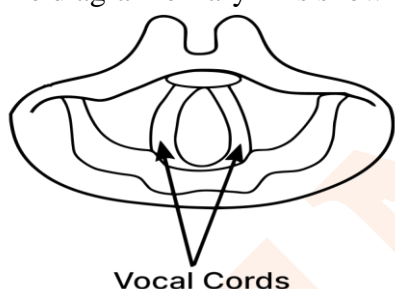
I'd suggest that they go for the house that's three lanes away from the roadside. Being further from the roadside reduces the level of noise pollution from passing vehicles, making it a quieter and more peaceful living environment.

Question 12

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

Answer

The diagram of larynx is shown below:



Larynx is known as the voice box in the human body. There are two vocal cords across 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.

Question 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?

Answer

Thunder is heard a few seconds after lightning is seen because sound travels much slower than light.

Light takes almost negligible time in comparison to sound in reaching us from the place of thunder because speed of light is much more ($3 \times 10^8 \text{ ms}^{-1}$) than the speed of sound ($= 330 \text{ ms}^{-1}$).

Exercise F- MCQ Practise

1. A list of mediums is given below.

- (i) Wood (iii) air
- (ii) Water (iv) vacuum

In which of these mediums can sound travel?

- (a) i & ii only (c) iii & iv only
- (b) i, ii & iii only (d) ii, iii & iv only

2. The loudness of sound depends on:

- (a) Its amplitude. (c) Its time period.
- (b) Its frequency. (d) Its speed.

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

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

- (a) 0.02 s (c) 0.2 s
- (b) 2 s (d) 20.0 s

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.

6. Loudness of sound is measured in units of (a) decibel (dB)

- (b) Hertz (Hz)
- (c) Metre (m)
- (d) metre/second (m/s)

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



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

9. Pitch of sound is determined by its

- (a) Frequency
- (b) Amplitude
- (c) Speed
- (d) Loudness

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

Answers

1. b 2. a 3. d 4. a 5. c 6. a 7. a 8. c 9. a 10. c

Exercise G

1. 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?

Answer- The loudness of sound depends upon the amplitude of vibration.

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

Answer- Explain how a vibrating body produces sound and how it travels through the air and is heard by us by our ears.

3. 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?

Answer- The loudness of the sound will decrease as the air is removed slowly from the plastic bottle. If the air in the plastic bottle is removed completely, there is vacuum in the bottle. The sound cannot travel through vacuum and we cannot hear the sound of the alarm clock at all.