
Exercise

(A). Fill in the blanks : (Ans.)

1. time period
2. amplitude
3. less
4. Hertz (Hz)
5. noise

(B). True or false :

1. True
2. False
3. False
4. True
5. False
6. True
7. True

(C). Choose the correct option :

1. Which of the following waves don't require any kind of medium to propagate ?

Ans. light waves

2. Frequency is.....

Ans. number of vibrations in 1 second

3. Time period.....

Ans. is inversely proportional to frequency

4. The maximum displacement of sound wave from mean position is called.....

Ans. amplitude

5. In which of the following, speed of the sound is maximum.....

Ans. steel

(D) Answer these following questions: (Ans.)

Ans.1) 1. Vibration : The to and fro movement of an object about its rest position is called vibration or oscillation. One complete to and fro movement is counted as one oscillation.

2. Amplitude : The maximum extent of vibration of a vibrating body from its mean position is known as amplitude. The SI unit of amplitude is metre (m).

3. Frequency : The number of vibrations made by the vibrating body in one second is called frequency. The SI unit of frequency is hertz (Hz).

4. Time period : The time taken by the vibrating body for one complete vibration i.e. one complete to and fro motion is known as time period of vibration. The SI unit of time period is second (s).

Ans.2) Four ill-effects created by noise pollution :

- (a) High blood pressure, and anxiety, irritation may be caused by noise pollution.
- (b) A long exposure to noise pollution may result in the loss of hearing or even deafness.
- (c) Noise pollution reduces concentration and hence contributes towards the loss of work efficiency.
- (d) Noise causes anger, tension and interferes with our sleep pattern.

Ans.3) Three ways of reducing noise pollution in homes are :

- (a) Turn off appliances at home and offices.
- (b) Shut the door when using noisy machines.
- (c) Use Headphones and Earplugs.

Ans.4) Aim : To prove that sound needs a medium to travel.

Material required : electric bell, glass bell jar, vacuum pump.

Procedure : 1. The electric bell is suspended inside the airtight bell jar.

2. The bell jar is connected to a vacuum pump.

3. Press the switch so that we can hear the bell.

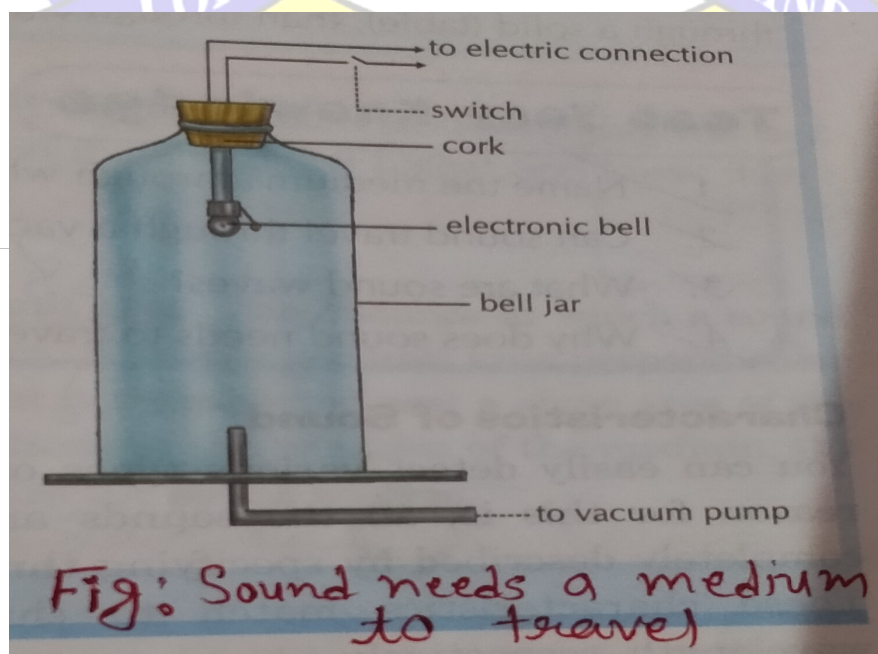
4. Now start the vacuum pump and pump out all the air from inside the jar.

Observation : 1. When the air in the jar is pumped out gradually the sound becomes fainter although the same current is passing through the bell.

2. When the air left inside the jar is minimal, the sound becomes extremely feeble.

3. If a vacuum is created by pumping out air completely, no sound is heard.

Conclusion : We can conclude that sound needs a medium to travel and air cannot travel in vacuum.



Ans.5) Infrasonic vibration : Low frequency sound which human ear cannot detect.

Infrasonic vibrations have frequency less than 20 hertz and are inaudible to the human ear.

Ans.6) Human can hear sound only of frequency between the ranges of 20 Hz to 20,000 Hz. Such such vibrations are called sonic vibrations or sound vibrations.

Ans.7) Depending on the vibrating body musical instruments are classified into three types :

1) Membrane Instruments : These are instruments in which vibrations are produced by the stressed skin. For example : Tabla, drum (mridangam), ghatam (mud pots).

2) String Instruments : These are instruments in which vibrations are produced by the stretched strings. For example : Guitar, sitar, violin, sarod and veena.

3) wind instruments : These are instruments in which vibrations are produced by the air column. For example : flute, shehnai, clarinet, jal tarang.

Ans.8) The different parts of the human ear and their role in hearing :

1. Outer Ear : The outer ear or external ear is the visible portion of the ear which is called the pinna. It protects the eardrum. It collects and directs sound waves into the middle ear.

2. Middle Ear : The middle ear is an air-filled cavity and consists of the following parts :

a. Eardrum - It is a thin membrane which vibrates as soon as it receives sound waves and transforms the sound energy into mechanical energy.

b. Hammer, Anvil and Stirrup - These three bones are attached to the eardrum. When the vibrations of the ear drum strike them they all vibrate one after the other and eventually, they pass the waves to the inner ear.

c. Inner Ear : It is connected to nerve called auditory nerve which passes on the electrical impulses generated by the nerve cells to the brain.

Ans.9) The characteristics of sounds such as its loudness or pitch and quality.

1. Loudness : loudness of the sound depends on its amplitude of vibration. It has found out that loudness is proportional to the square of the amplitude.

2. Pitch : It denotes the shrillness or flatness of a sound. For instance, a whistle has a shrilling sound than drum. The whistle is said to have a higher pitch than the drum.

3. Quality : The adjustment allows the frequency to match and this is called quality of sound also called timbre. The quality of a note depends on the nature and number of overtones.

Ans.9) Because light travels much faster than sound. So we see the lightning first before we are able to listen to the clap of thunder.

(Questions from NCERT for practice):

(A) Choose the correct answer:

1. Sound can travel through.....

Ans. solids, liquids and gases

2. Which of the following voices is likely to have minimum frequency?

Ans. A man

(B) Indicate whether the following statements are true or false :

1. True

2. False

3. False
4. True
5. False
6. False
7. True

(C) Fill in the blanks with suitable words: (Ans.)

1. time period
2. amplitude
3. Hertz
4. Noise
5. frequency

(D) The no. of oscillations per second of the vibrating body is known as the frequency of oscillation.

Frequency = Total no. of oscillations

Total time taken = $50/5 = 10$ Hz

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

Time period = $1/\text{oscillating frequency}$
 $= 1/10 = 0.1$ sec.

Frequency = 10 Hz, and Time period = 0.1 sec. (Ans.)

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:

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

Time period = 1

Oscillation frequency

Oscillation frequency = 500 Hz

Time period = $1/500 = 0.002$ s

(E)

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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, 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

(F)

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

Soln:

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

Noise 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.

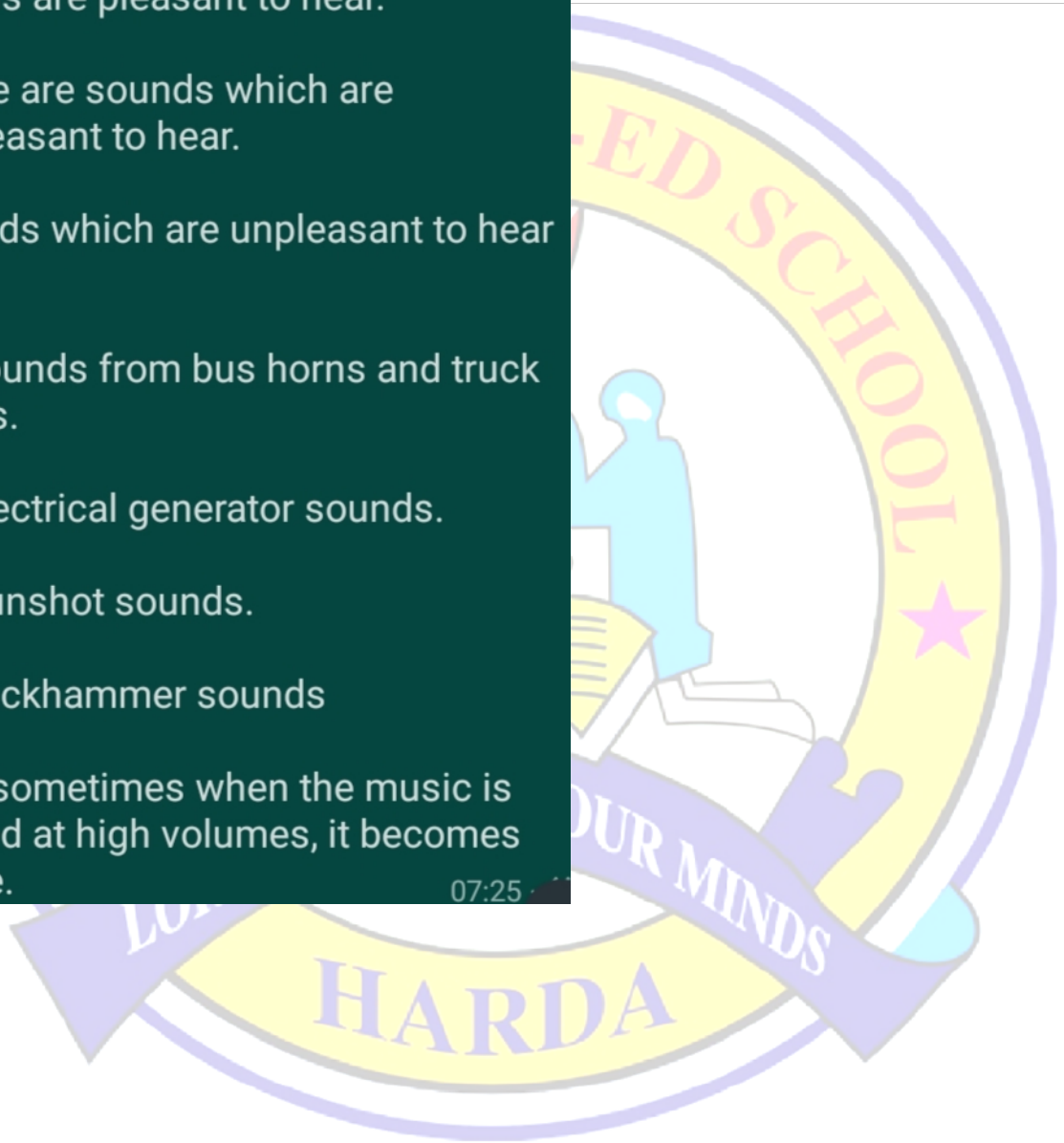
(c) Gunshot sounds.

(d) Jackhammer sounds

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

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(G)



9. List sources of noise pollution in your surroundings.

Soln:

Noise pollution sources are

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

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(H).

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

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

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(I).



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 noise decreases. So it's better to buy the house which is three lanes away.

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(J)

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

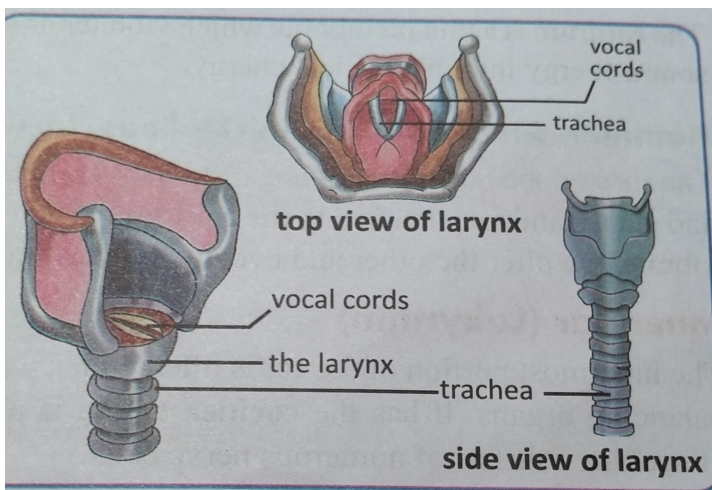
Soln:

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.

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(K).





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:

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

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(L).

Additional question.

Qué. Draw the labelled diagram of the different parts of the human ear.

