



মণিপুরৰ শিক্ষা বিভাগ (সি)

DEPARTMENT OF EDUCATION (S)
Government of Manipur

CHAPTER-13

SOUND

SOLUTIONS:

EXERCISES

Q1. Choose the correct answer

Sound can travel through

a) Gases only b) solids only, c) liquids only, d) solids, liquids and gases.

Ans- d) solids, liquids and gases.

Q2. Voice of which of the following is likely to have minimum frequency?

a) Baby girl b) Baby boy c) A man d) A women

Ans-b) Baby boy

Q3. In the following statements, tick 'T' against those which are true and 'F' against those which are false.

- a. Sound cannot travel in 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 vibration is large, sound is feeble (T/F)
- d. For human ears, the audible range is 20Hz to 20,000Hz. (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)

Ans.

a.True b. False c. False d. True f. false g. True



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Q4. 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.

Ans- a. Time period b. Amplitude c. Hertz (Hz) d. Noise e. Frequency.

Q5. A pendulum oscillates 40 times in 4 secs. Find its time period and frequency.

Ans- Given that,

Number of Oscillation =40

Total time taken= 4 seconds

Time period = time taken in one oscillation

= total time/ total number of oscillation

= 4 seconds/40 = 1/10 seconds. =0.1 sec

Again, frequency =number of Oscillations per second

= number of vibrations/ time taken

= 40/4 per second= 10 per second

=10 Hz

Q6. 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?

Ans- Number of vibrations per second=500

Time period = time taken for one vibration.

= total time/ number of vibration = 1/ 500 Hz.

= 0.002 Hz

Q7. Identify the part which vibrates to produce sound in the following instruments.

- a. Dholak b. Sitar c. Flute.

Ans- a. Stretched membrane

b. String of sitar

c. Air column.

Q8. What is the difference between noise and music? Can music become noise sometimes?

Ans- Unpleasant sounds are called noise where as music is a sound which is pleasing to the ear.

Music becomes noise sometimes if a musical sound is too loud.

Q9. List sources of noise pollution in your surroundings.

Ans- Sources of noise pollution are:

i. Sounds of vehicles, explosions including bursting of crackers, machines, loudspeakers, etc.

ii. Sounds of television and transistor radio at high volumes.

iii. Sounds of Kitchen appliances, desert coolers, air conditioners, etc.

Q10. Explain in what way noise pollution is harmful to human

Ans. Presence of excessive noise in the surroundings may cause many health related problems. e.g. Lack of sleep, hypertension (high blood pressure), anxiety, temporary or even permanent impairment of hearing, etc.

Q11. 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.

Ans. I would suggest our parents to buy the house which is three lanes away from the roadside. This is because the house on the roadside will receive the unwanted sounds of vehicles whereas the house which is three lanes away from the roadside will be free from noise pollution.



Q12. Sketch larynx and explain its function in your own words.

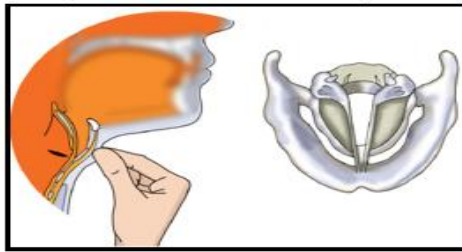


Fig. Voice Box in Human

In humans, the sound is produced by the voice box or the larynx. It is situated in the throat. It is at the upper end of the windpipe. Two vocal cords, are stretched across the voice box or larynx in such a way that it leaves a narrow slit between them for the passage of air. When the lungs force air through the slit, the vocal cords vibrate, producing sound.

Q13. Lighting and thunder take place in the sky at the same time and at the same distance from us. But lightning is seen earlier and thunder is heard later. Can you explain why?

Ans. Lightning and thunder take place in the sky at the same time and at the same distance from us. But lightning is seen earlier and thunder is heard later because light travels much faster than sound. Light can travel through a vacuum but sound cannot travel through a vacuum.

EXTRA QUESTIONS AND ANSWERS:

Q1. How is sound produced?

Ans. Sound is produced by a vibrating object.

Q2. What is vibration?

Ans. The to and fro or back and forth motion of an object is called vibration.

Q3. Which object is vibrating when the following sounds are produced?

- i. The sound of the tabla.
- ii. The sound of a sitar or Veena
- iii. The sound of a school bell.

Ans.

- i. The stretched membrane vibrates to produce sound.
- ii. Strings of sitar or veena vibrate to produce sound.
- iii. The disc of the bell when struck with a hammer vibrates to produce sound.

Q4. On which principle, the Indian musical instrument 'Jal Tarang' works?

Ans. Jal Tarang works on the principle that the quality of the sound changes with the change in its frequency. Metal tumblers filled with water up to different heights, give vibrations of different frequencies, hence produce different types of sounds.

Q5. How is sound produced in humans?

Ans. In humans, voice box or the larynx is the most important source of sound. Two ligaments, known as vocal cords are stretched across the larynx in such a way that it leaves a narrow slit between them for the passage of air. When the lungs force air through the slit, the vocal cords vibrate, producing sound.

Q6. Can sound travel through a vacuum?

Ans. Sound cannot travel through a vacuum. Sound needs a medium for propagation i.e., solid, liquid or gas.

Q7. Describe an activity to show that sound can travel through solids.

Ans. Let us press our ear at one end of a long wooden or metallic table and ask a friend to gently scratch the other end of the table. We will hear the sound of scratching through the wooden or metallic table quite loudly. This means that sound can travel through solid.

Q8. Describe an activity to show that sound can travel through liquid.

Ans. Take a bucket or a bath tub and fill it with clean water. Take a small bell in one hand and shake this bell inside the water to produce sound. If we put our ear gently on the water surface, we can hear the sound of the bell. This shows that sound can travel through liquid.

Q9. How do we hear sound through our ears?

Ans. When sound enters ear, it travels down a canal at the end of which there is a thin stretched membrane called eardrum. The eardrum is like a stretched rubber sheet. Sound vibrations make the eardrum vibrate. The eardrum sends vibrations to the inner ear. From there, the signal goes to the brain. This is how we hear sound through our ears.

Q10. Define amplitude of vibration.

Ans. It is the maximum displacement of a vibrating object from its central position.

Q11. What is called time period?

Ans. It is the time taken by a vibrating body to complete One Oscillation.

Q12. What is frequency of oscillation?

Ans. The number of oscillations per second is called the frequency of oscillation. It is expressed in Hertz (Hz)

Q13. What do you mean by loudness of sound?

Ans. Loudness of sound refers to how loud or soft a sound seems to a listener.

Q14. On which property of vibrations does the loudness of sound depends?

Ans. The loudness of sound is determined by its amplitude. When the amplitude of vibration is large, the sound produced is loud. When the amplitude is small, the sound produced is feeble.

Q15. How does the loudness of sound depend upon the amplitude?

Ans. Loudness of sound is proportional to the square of the amplitude of the vibration producing the sound. e.g- If the amplitude becomes twice, the loudness increases by a factor of 4.

The unit of loudness of sound is decibel (dB)

Q16. Which property of vibration determines the pitch of the sound? Explain giving examples.

Ans. The frequency determines the shrillness or pitch of a sound. If the frequency of vibration is higher we say that the sound is shrill and has a higher pitch. If the frequency of vibration is lower, we say that the sound has a lower pitch. For example, a drum vibrates with a low frequency. Therefore, it produces a low pitch sound. On the other hand, a whistle has a high frequency and therefore, produces a sound of higher pitch.

Q17. What is the audible range of frequencies for human beings? Explain.

Ans. Sounds of frequencies less than about 20 vibrations per second (20Hz) cannot be detected by human ear, such sounds are called inaudible. Sounds of frequencies higher about 20,000 vibrations per second (20KHz) are also not audible to the human ears. Thus, for human ears, the range of audible frequencies is roughly from 20 to 20,000 Hz.

Q18. What is noise pollution? What are its major causes?

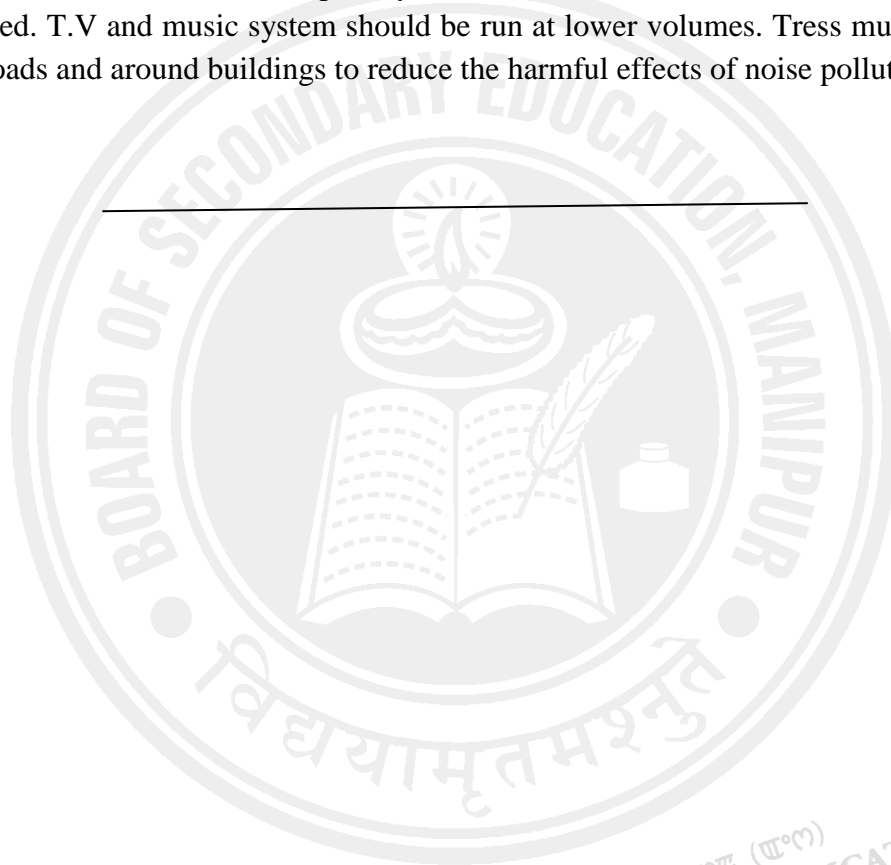
Ans. Presence of excessive or unwanted sounds in the environment is called noise pollution. Major causes of noise pollution are sounds of vehicles, explosion including bursting of crackers, machines, loudspeakers, etc.

Q19. How can we control noise?

Ans. To control noise, we must control the sources of noise. For this, silencing devices must be installed in air craft engines, transport vehicles, industrial machines and home appliances.

Q20. How can the noise pollution be controlled in a residential area?

Ans. The noisy operations must be conducted away from any residential area. Noise producing industries should be set up away from such areas. Use of automobile horns should be minimized. T.V and music system should be run at lower volumes. Trees must be planted along the roads and around buildings to reduce the harmful effects of noise pollution.



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