

Chapter 13 Sound

Question 1.

Choose the correct answer.

Sound can travel through

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

Answer:

- (d) solids, liquids, and gases.

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

Question 3.

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

1. Sound cannot travel in a vacuum.
2. The number of oscillations per second of a vibrating object is called its time period.
3. If the amplitude of vibration is large, the sound is feeble.
4. For human ears, the audible range is 20 Hz to 20,000 Hz.
5. The lower the frequency of vibration, the higher is the pitch.
6. Unwanted or unpleasant sound is termed as music.
7. Noise pollution may cause partial hearing impairment.

Answer:

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

Question 4.

Fill in the blanks with suitable words.

1. Time taken by an object to complete one oscillation is called _____
2. Loudness is determined by the _____ of vibration.
3. The unit of frequency is _____
4. Unwanted sound is called _____
5. The shrillness of a sound is determined by the _____ of vibration.

Answer:

1. Time period
2. Amplitude
3. Hertz (Hz)
4. Noise
5. Frequency

Question 5.

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

Answer:

No. of oscillation = 40

Total time is taken = 4 seconds

$$\begin{aligned} \text{Time period} &= \frac{\text{time}}{\text{number of oscillations}} \\ &= \frac{4 \text{ seconds}}{40} = \frac{1}{10} \text{ second} = 0.1 \text{ second.} \end{aligned}$$

$$\begin{aligned} \text{Frequency} &= \text{number of oscillations per second} \\ &= \frac{\text{number of oscillations}}{\text{time}} \\ &= \frac{40}{4} \text{ second} = 10 \text{ per second or } 10 \text{ Hz} \end{aligned}$$

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:

Number of vibrations per second = 500

$$\begin{aligned} \text{Time period} &= \frac{\text{time}}{\text{number of vibration}} \\ &= \frac{1}{500} = 0.002 \text{ second} \end{aligned}$$

Question 7.

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

1. Dholak
2. Sitar
3. Flute

Answer:

1. Stretched membrane
2. String of sitar
3. Air column

Question 8.

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

Answer:

The type of sound which are unpleasant to listen is known as noise whereas music is a pleasant sound, which produces a sensation.

Yes, music can become noise when it's too loud.

Question 9.

List the sources of noise pollution in your surroundings.

Answer:

Following are the major sources of noise pollution:

- Sound of vehicles
- Sound of kitchen appliances
- Sound of bursting crackers
- Sound of loudspeakers, TV, transistors

Question 10.

Explain in what way noise pollution is harmful to humans.

Answer:

Noise pollution causes:

- (a) Lack of sleep
- (b) Anxiety
- (c) Hypertension

and these are harmful to health.

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:

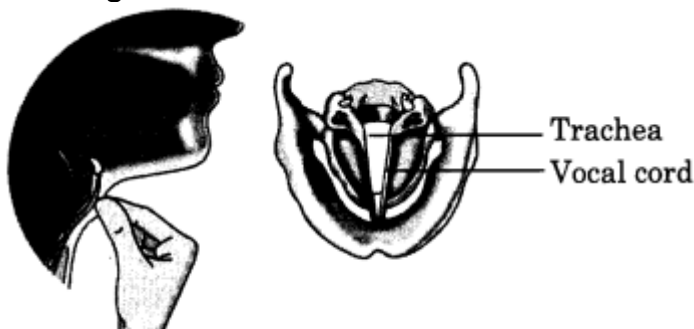
I would suggest my parents buy a house three lanes away from the roadside because house on the roadside would be much noisy in both days and night due to running vehicles. Whereas, a house three lanes away would be comparatively quieter as the intensity of noise decreases with the distance between the source and the listener.

Question 12.

Sketch larynx and explain its function in your own words.

Answer:

Larynx is also known as voice box. 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 passage of air (Fig. 13.12). When lung force air through the slit, the vocal cords vibrate, producing sound. Muscles attached to the vocal cords can make the cords tight or loose.



Larynx in human

When the vocal cords are tight and thin, the type or quality of voice is different from that when they are loose and thick.

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:

The speed of light is more than that of the speed of sound. Thus, due to more speed of light it reaches us before sound. So, lightning is seen earlier and thunder is heard later.

Chapter 13 - 1 Mark Questions and Answers

Question 1.

Choose the correct answer. Sound can travel through

- Gases only
- Solids only
- Liquids only
- Solids, liquids and gases.

Answer:

Solids, liquids and gases.

Question 2.

Voice of which of the following is likely to have minimum frequency ? [NCERT]

- Baby girl
- Baby boy
- A man
- A woman

Answer:

Aman

Question 3.

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

- Dholak
- Sitar
- Flute

Answer:

- Dholak - stretched membrane
- Sitar - stretched string
- Flute - air column

Question 4.

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

1. Sound cannot travel in vacuum. (T/F)
2. The number of oscillations per second of a vibrating object is called its time period. (T/F)
3. If the amplitude of vibration is large, sound is feeble. (T/F)
4. For human ears, the audible range is 20 Hz to 20,000 Hz. (T/F)
5. The lower the frequency of vibration, the higher is the pitch. (T/F)
6. Unwanted or unpleasant sound is termed as music. (T/F)
7. Noise pollution may cause partial hearing impairment. (T/F)

Answer:

1. T
2. F
3. F
4. T
5. F
6. F
7. T

Question 5.

Fill in the blanks with suitable words. [NCERT]

1. Time taken by an object to complete one oscillation is called
2. Loudness is determined by the of vibration.
3. The unit of frequency is
4. Unwanted sound is called
5. Shrillness of a sound is determined by the of vibration.

Answer:

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

Question 6.

Define vibration.

Answer:

Vibration is the to and fro or back and forth motion of an object.

Question 7.

Which part of the human body is responsible for producing sound ? [NCT 2011]

Answer:

In humans, the sound is produced by the voice box or larynx

Question 8.

What is the length of vocal cords in men ?

Answer:

The vocal cords in men are about 20 mm long.

Question 9.

Can sound travel in vacuum ?

Answer:

No, sound cannot travel in vacuum.

Question 10.

What is meant by oscillatory motion ?

Answer:

The to and fro motion of an object is known as oscillatory motion.

Question 11.

Define frequency.

Answer:

The number of oscillations per second is called the frequency of oscillation.

Question 12.

Define 1 hertz.

Answer:

A frequency of 1 hertz means one oscillation per second.

Question 13.

How are frequency of a sound and pitch related ?

Answer:

If the frequency of vibration is higher then the sound has a higher pitch.

Question 14.

Whose voice has a higher frequency - man or woman ?

Answer:

The voice of woman has higher frequency.

Question 15.

What is range of audible sound ?

Answer:

Sound of frequency 20 Hz to 20,000 Hz is the audible range.

Question 16.

Which animal can hear sounds of frequencies higher than 20,000 Hz ?

Answer:

Dogs can hear frequencies higher than 20,000 Hz.

Question 17.

What is meant by base loudness level ?

Answer:

The base loudness level is defined as that loudness of sound that the human ear can just perceive.

Question 18.

What is meant by noise pollution ?

Answer:

Presence of excessive or unwanted sound in the atmosphere is called noise pollution.

Question 19.

If the frequency of a sound is below 20 Hz, will it be audible to human beings ?

Answer:

No, it will not be audible.

Question 20.

In which state of matter does sound travel the

- slowest
- fastest ?

Answer:

- Air.
- Solids.

Question 21.

What happens to sound when it strikes a surface ?

Answer:

Sound gets reflected on striking a surface.

Question 22.

Why do we hear the sound of the horn of an approaching car before the car reaches us ?

Answer:

This happens because the speed of sound is much greater than the speed of the car.

Chapter 13 - 2 Mark Questions and Answers

Question 1.

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 ? [NCERT]

Answer:

Time taken for 500 vibrations = 1 second

Time taken for 1 vibration = $1/500$ second.

∴ Time period = $1/500$ second.

Question 2.

How do plants help in reducing noise pollution ?

Answer:

Plants absorb sound and so help us in minimizing noise pollution.

Question 3.

How can we control the sources of noise pollution ?

Answer:

We can control noise pollution by designing and installing silencing devices in machines.

Question 4.

How can a hearing impaired child communicate ?

Answer:

A hearing impaired child can communicate effectively by using sign language.

Question 5.

If the amplitude increases 3 times, by how much will the loudness increase ?

Answer:

If the amplitude increases three times, the loudness will increase by a factor of 9.

Question 6.

The frequency of a given sound is 1.5 kHz. How many vibrations is it completing in one second ?

Answer:

Frequency = No. of vibrations/time

∴ No. of vibrations = Frequency x time = $1.5 \times 1000 \times 1 = 1500$ vibrations

Question 7.

Which characteristic of a vibrating body determines

1. loudness
2. pitch of the sound produced by it ?

Answer:

1. Amplitude.

2. Frequency.

Question 8.

Why do we not hear echoes in our ordinary surroundings ?

Answer:

We do not hear echoes in our ordinary surroundings because the distance to hear echo should be more than 17 m.

Question 9.

We cannot hear the sound of the exploding meteors in the sky, though we can see them. Why ?

Answer:

Sound cannot travel through vacuum. In space there is vacuum. Light can travel through vacuum, so we can see the exploding meteor but cannot hear the explosion.

Question 10.

We can hear the supersonic jet planes flying. How ?

Answer:

The supersonic jet planes fly in the air. Since sound can travel through air, we can hear them flying.

Question 11.

What are vocal cords ? What is their function ? [NCT 2011]

Answer:

The larynx has a pair of membranes known as vocal cords stretched across their length. The vocal cords vibrate and produce sound.

Question 12.

When does a thud become music ?

Answer:

When thuds are repeated at regular intervals, it becomes music, e.g., beating of drums or wood.

Question 13.

How do birds and insects produce sound ?

Answer:

Birds chirp with the help of syrinx in their wind pipe. Insects produce sound by flapping their wings.

Question 14.

What is the function of Eustachian tube in human ear ?

Answer:

The vibrations of the spoken words reach our ears through Eustachian tubes.

Question 15.

1. In our body which part of the ear receives sound waves ?
2. What may happen if the eardrum is absent from our ear ?

Answer:

1. Pinna helps in receiving sound waves.
2. If the eardrum is absent we would not be able to hear.

Question 16.

Can a hearing impaired child speak ? If not why ?

Answer:

A child having hearing impairment can not speak because if he is able to hear, he will learn to speak.

Question 17.

Give an example each of:

1. stringed instrument
2. percussion instrument
3. wind instrument
4. striking instrument

Answer:

1. Violin
2. Drums
3. Flute
4. Jal Tarang

Question 18.

Can sound travel through water ? How do whales communicate under water ?

Answer:

Yes, sound can travel through water. Since sound can travel through water, the whales can communicate with each other.

Question 19.

How is the pressure variation in a sound wave amplified in human ear ?

Answer:

The pressure variation in a sound wave causes vibrations in the eardrum. These vibrations are amplified several times by the three bones. (The hammer, anvil and stirrup).

Question 20.

How is that you can hear a friend talking in another room without seeing him ?

Answer:

Sound can travel in all directions and around comers. Light cannot travel around comers. Therefore, we can hear a friend talking in another room but cannot see him.

Chapter 13 - 3 Mark Questions and Answers

Question 1.

List sources of noise pollution in your surroundings. [NCERT]

Answer:

The major sources of noise pollution are sounds of vehicles, explosions, machines, loudspeakers.

Question 2.

What are the effects of noise pollution ?

Answer:

Due to noise pollution a person may suffer from lack of sleep, hypertension and anxiety. If a person is exposed to noise continuously he may get temporary or permanent deafness.

Question 3.

How can the noise pollution be controlled in residential area ?

Answer:

1. The noisy operations must be conducted away from residential areas.

2. Noise producing industries should be set away from such areas.
3. Use of automobile horns be minimized.
4. TV and music systems should be run at lower volumes.

Question 4.

A pendulum oscillates 40 times in 4 seconds. Find its time period and frequency. [NCT 2011, NCERT]

Answer:

40 vibrations in 4 seconds.

10 vibrations in 1 second

Frequency = 10 vibrations/sec. or 10 Hz.

∴ Time period = 1/10 sec.

Question 5.

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. [NCERT]

Answer:

I would advise my parents to buy the house three lanes away from the roadside because there the noise from automobiles would be much less.

Question 6.

What happens when we pluck the strings of a sitar?

Answer:

When we pluck the strings of a sitar, the whole instrument vibrates and the sound is heard.

Question 7.

Why is the voice of men, women and children different?

Answer:

The voice of men, women and children are different because the length of vocal cords are different. The length of vocal cords is longest in men and shortest in children.

Question 8.

How are we able to hear sound?

Answer:

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 and we are able to hear.

Question 9.

What sources in the home may lead to noise?

Answer:

Television and transistor at high volumes, some kitchen appliances, desert coolers, air conditioners all contribute to noise pollution.

Question 10.

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

Answer:

Unpleasant sounds are called noise.

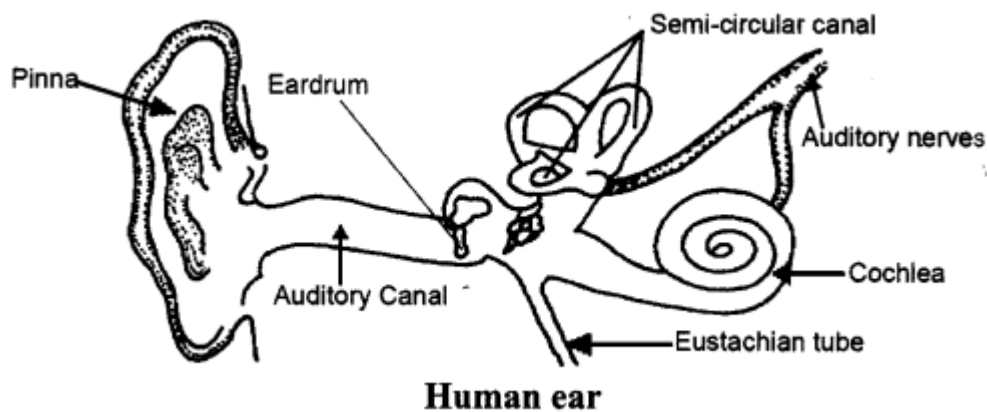
Music is a sound which produces a pleasing sensation.

If the music is too loud, it becomes noise.

Question 11.

Draw a labelled diagram showing the structure of the human ear.

Answer:



Question 12.

What is the function of:

1. External ear.
2. Internal ear.

Answer:

1. The external ear helps us in receiving the sound waves and directing them to the eardrum.
2. The internal ear has cochlea which is filled with a fluid and having tiny hair cells inside. The hairy cells change the sound vibrations into nerve impulse which travels to the brain. The internal ear also helps us in balancing the body.

Question 13.

Give some suggestions by which we can keep our ears healthy.

Answer:

1. Never insert any pointed object into the ear. It can damage the eardrum and make a person deaf.
2. Never shout loudly in someone's ear.
3. Never hit anyone hard on their ear.

Question 14.

Can you hear the sound on the moon ? Explain.

Answer:

We cannot hear the sound on the moon because sound requires a material medium to travel. On the moon there is no atmosphere and sound cannot travel in vacuum.

Question 15.

What are ultrasounds ? How are they useful to us?

Answer:

Sound having frequency higher than 20kHz is known as ultrasound, is used for

- detecting finer faults in metal sheets.
- scanning and imaging the body for stones, tumour and foetus.

Chapter 13 - 5 Mark Questions and Answers

Question 1.

Sketch larynx and explain its function in your own words. [NCERT]

Answer:

We produce sound in the larynx of our throats. The larynx has two vocal cords, which are folds of tissue with a slit like opening between them. When we speak, air passes through the opening and the vocal cords vibrate to produce sound.

Question 2.

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 ? [NCERT]

Answer:

The speed of light is more than the speed of sound. Therefore, even though thunder and lightning take place simultaneously, we see the lightning earlier.

Question 3.

1. What is SONAR?
2. What is the basic principle of its working ?
3. Explain its use.

Answer:

1. SONAR refers to Sound Navigation and Ranging.
2. The principle of reflection of sound is used in SONAR.
3. SONAR is used to measure the depth of the ocean. Ultrasonic waves are sent from the ship down into the sea. They are received back after reflection from the sea bed. The depth is calculated by noting the time period.

Question 4.

What is the use of ultrasound in medicine and industry ?

Answer:

Use of ultrasound in medicine :

- For scanning and imaging the body for stones, tumour and foetus.
- For relieving pain in muscles and joints.

Use of ultrasound in industry :

- For detecting finer faults in metal sheets.
- In dish washing machines where water and detergent are vibrate with ultrasonic vibrators.
- For homogenising milk in milk plants.

Question 5.

What is a sonogram ? Why is it preferred to X-rays ?

Answer:

Sonogram is image of the internal organs. Ultrasound can pass through the human body and are reflected back. The reflections are recorded by computer and images are generated on the screen.

Sonogram is not harmful and is therefore used for studying the foetus or stone or tumor in the organs. On the other hand, X-rays can be harmful if humans are exposed for longer time.

Question 6.

1. Name a property of sound which is
(i) similar to the property of light.
(ii) different from that of light.

2. Why do some people have hearing impairment ? How do they communicate with others ?

Answer:

1. (i) The property of sound similar to light is that in both reflection takes place.
(ii) Sound can travel around comers but light cannot.
2. Some people suffer from hearing impairment because their ear drum is damaged or absent. This can be from birth or may occur later on. Such people communicate with “sign language”. They can also use “hearing aids”.