

PARAGON CONVENT SCHOOL

SECTOR : 24 B, CHANDIGARH

LESSON - 13

SOUND

Summary:

- Sound waves are produced by to and fro movement of objects.
- Sound waves need a medium to travel.
- Sound waves travel by means of compressions and rarefactions.
- Sound travels with different speeds in different media.
- Loudness of sound is determined by the amplitude of sound wave. It is the measure of change in pressure in a compression or rarefaction of a sound wave.
- Frequency of a sound wave is the number of compressions and rarefactions passing through a point.
- A sound wave with high pitch has high frequency and sounds shrill. A sound wave with low pitch sounds are dull and has low frequency.
- Timbre is the quality of sound that helps us distinguish between sounds made by different sources.
- There are three parts of human ear. Sound parts travels from the outer ear to the middle ear and then to the inner ear from where it is transmitted to the brain.
- In human beings, hearing range is 20 Hz 20,000 Hz.
- An echo is produced by reflection of sound from a hard surface.
- Soft surfaces like clothes, curtains, sand, etc. are good absorbers of sound.
- Excessive sound in the atmosphere is called noise pollution.

Multiple Choice Questions (Page No. 183)

1. (b) 2. (a) 3. (a) 4. (d) 5. (c)

Multiple Choice Questions (Page No. 189)

1. (c) 2. (c) 3. (b) 4. (d) 5. (b)

Multiple Choice Questions (Page No. 192)

1. (a) 2. (b) 3. (c) 4. (b) 5. (c)

SECTION A

Oral questions

Q1.- What is sound?

Ans.- Sound is a form of energy which produces a sensation of hearing in our ears.

Q2.- In which medium does sound travels the - a) fastest b) slowest?

Ans.- (a) In solids (b) In gases

Q3.- Name the bones present in the middle ear.

Ans.- Hammer, anvil and stirrup.

Science Quiz

Q1.- What is the audible range of the human ear?

Ans.- 20 Hz - 20,000 Hz

Q2.- Name the organs that produces sound in humans.

Ans.- Voice box or larynx

Q3.- On what factor does the loudness of sound depends?

Ans.- Loudness of sound depends upon the amplitude of vibrations.

Q4.- What do you mean by infrasonic vibrations?

Ans.- Inaudible sounds having frequency less than 20 Hz are known as infrasonic vibrations.

WORKSHEET

Tick (✓) the correct options

1. (c) 2. (a) 3. (a) 4. (a)

Circle the odd ones. Give reasons for your choice

1. 40db 70db 150db 90db

Ans.- 40 dB → It is the loudness level of normal conversation, whereas others are the loudness levels of loud sounds which cause noise pollution.

2. Soft horns Ear plugs Silencers Loudspeakers

Ans.- Loudspeakers → They increase noise pollution, whereas others are used to decrease noise pollution.

3. Guitar Violin Flute Veena

Ans.- Flute → This is a wind instrument, whereas others are stringed instruments.

SECTION B

Multiple Choice Questions

1. (c) 2. (c) 3. (a)

Very Short Answer Questions

Q1.- Name two wind instruments.

Ans.- Flute, shehnai, trumpet

Q2.- What is meant by amplitude?

Ans.- Amplitude is the maximum displacement of the bob from its mean position on either side.

Q3.- What is meant by frequency?

Ans.- The number of oscillations made by a simple pendulum per second is called frequency of the pendulum.

Short Answer Type-I Questions

Q1.- How is music produced in wind instruments?

Ans.- Wind instruments are generally made in the form of pipes. When we blow air into them, the column of air inside vibrates, producing a notes (a sound of particular frequency).

Q2.- What is the relationship between the loudness and the amplitude of a vibrating object?

Ans.- Loudness of sound is directly proportional to the square of amplitude of the vibration, producing the sound.

Loudness \propto Amplitude²

Q3.- What happens when the vibrations are passed into the cochlea of the inner ear?

Ans.- Cochlea receives the amplified vibrations from the three bones of middle ear and converts them into nerve impulses and sends to the brain through auditory nerves.

Q4.- Name any two animals which can hear sounds that we cannot hear.

Ans.- Dolphins and bats can hear the sounds that we cannot hear.

Q5.- How is the pitch varied in a) tabla b) violin c) flute?

Ans.- (a) By stretching the sheet spread on tabla surface.

(b) By varying the lengths of strings of violin.

(c) By closing the holes of the flute.

Q6.- To what special use can a Galton's whistle be put?

Ans.- The owners of dogs use Galton's whistles to give signals to their dogs.

Short Answer Type-II Questions

Q1.- What are ultrasonic sounds? Name two animals that produce ultrasonic sounds.

Ans.- Inaudible sounds having frequency more than 20,000 Hz are known as ultrasonic sounds. Animals like porpoises, dolphins and bats produce ultrasonic sounds.

Q2.- If a simple pendulum makes 20 oscillations in 4 seconds, what is its frequency?

Ans.- The pendulum makes 20 oscillations in 4 seconds. .

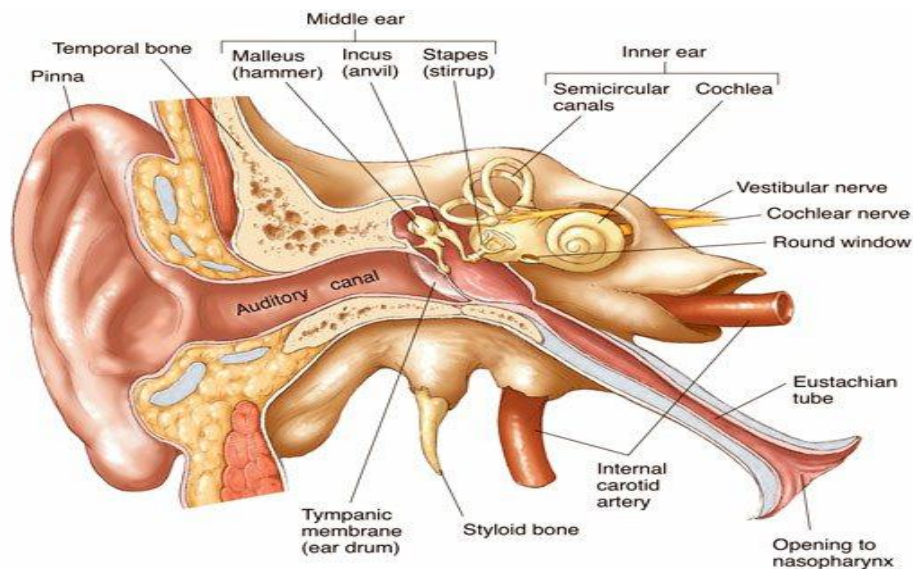
The pendulum makes oscillations in one second = 5 oscillations .

The frequency of pendulum = 5 Hz

Q3.- Draw a well labelled diagram of human ear.

Ans.-

Structure of Human Ear



Q4.- In your society, one of your friends is bursting crackers and playing loud music to celebrate India's victory in the Cricket match.

Do you think it is a correct way of celebration? Why/ Why not?

Ans.- It is not the correct way of celebration because bursting crackers causes air

pollution and playing loud music causes noise pollution, which is not good for our health. It disturbs the other people living in the neighborhood, especially the infants, old and the sick people.

Long Answer Questions

Q1.- a) What are the characteristics of sound? Define them.

b) How does the pitch of a sound depend on the frequency?

Ans.- (a) The characteristics of sound are - (i) pitch (ii) loudness and (iii) quality.

(i) Pitch : Pitch is the characteristic of sound by which we can distinguish a shrill sound from a grave (hoarse) sound even though the two sounds have the same loudness.

(ii) Loudness : Loudness is the characteristic of sound by which a loud sound can be distinguished from a faint sound even though both have the same pitch.

(iii) Quality : Quality of the sound is the characteristic that enables us to distinguish between two sounds of the same pitch and loudness produced by two different sources.

(b) Pitch of a sound depends upon the frequency of vibration.

(i) The pitch of the sound produced by an object vibrating with a low frequency is low and the sound is called a grave sound.

(ii) The pitch of the sound produced by an object vibrating with a high frequency is high and the sound is called shrill sound. Thus, the higher the frequency of the sound, the higher will be its pitch and vice versa.

Q2.- Explain the working of human ear with the help of a flow chart.

Ans.-

Pinna collects sound waves from the surroundings and sends them to the eardrum, through ear canal



When sound waves fall on the eardrum, they make eardrum to vibrate.



The three bones (hammer, anvil and stirrup) on receiving the vibrations from the eardrum amplify it.



Cochlea receives the amplified vibrations from three bones and converts them into nerve impulses and sends to the brain through auditory nerve.



Brain decodes nerve impulses into specific sound.

Q3.- a) What is noise pollution?

b) Name three sources of noise pollution.

c) Write any five measures to reduce noise pollution.

Ans.- (a) Noise from any source that causes disturbance or discomfort of any kind in the environment is called noise pollution.

b) The three sources of noise pollution are-

- (i) loudspeakers
- (ii) moving trains and aeroplanes
- (iii) bursting crackers
- (iv) excessive use of horns

(c) The five measures to reduce noise pollution are -

- (i) Automobiles should be fitted with silencers and soft horns
- (ii) We should not play radio, television and stereo system too loudly.
- (iii) The use of loudspeakers at social and religious functions should be banned.
- (iv) Machines should be maintained in a good condition to reduce industrial noise pollution.
- (v) We should avoid bursting fireworks that make loud noise.

(vi) The airports and noise making factories should be shifted away from the residential areas.