SCIENCE -8 (CH-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 1:

(d) Sound can travel through solids, liquids, and gases.
Sound requires a medium to travel through. Solid, liquid and gas provide the medium for sound. Hence, sound can travel through solids, liquids and gases.

Question 2:

Which of the following voices is likely to have minimum frequency?
(a) Baby girl (b) Baby boy
(c) A man (d) A woman

Answer 2:

(c) A man
The voice of an adult man is of lower pitch in comparison to the voices of a baby boy, a baby girl and a woman. Since frequency of a sound is directly proportional to its pitch, man's voice is of minimum frequency in comparison to a boy, a girl, or a woman's voice.

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 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 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 3:

(a) True
Sound requires a medium to travel through. Since vacuum is devoid of any medium, sound cannot travel through it.
(b) False
The number of oscillations per second of a vibrating object is known as its frequency. Time period is the time required to complete one oscillation.
(c) False
Loudness of a sound is proportional to the square of the amplitude of its vibration. When the amplitude of vibration of a sound is large, the sound is very loud. The sound is feeble for small amplitude.
(d) True
Humans cannot hear sounds of all frequencies. Humans can hear a sound whose frequency falls in the range of 20 Hz–20,000 Hz. The sound having frequency out of this range is inaudible to humans.

(e) False
The pitch of a sound is proportional to its frequency. As the frequency of vibration increases, the pitch of the sound also increases and vice-versa. A sound is said to be high pitched if its frequency of vibration is high, and is low pitched for a small frequency of vibration.
(f) False
Unwanted or unpleasant sounds are known as noise. Sounds that are melodious and pleasing to ear are known as music.
(g) True
Unwanted or unpleasant sounds are known as noise. If one is subjected to loud unpleasant sound continuously for a long time, then it may cause temporary hearing impairment.

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 4:

(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 (Hz)__.
(d) Unwanted sound is called __noise__.
(e) Shrillness of a sound is determined by the __frequency__ of vibration.
(Shrillness is also called pitch of the sound. Pitch is directly proportional to the frequency of vibration. Hence, shrillness is determined by the frequency of vibration.)

Question 5:

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

Answer 5:

Frequency of oscillations is defined as the number of oscillations of a vibrating body per second. It is given by

$$\text{Frequency} = \frac{\text{Number of oscillations}}{\text{Total time}} = \frac{40}{4} = 10 \text{ Hz}$$

The time required to complete one oscillation is known as time period. It is given by the inverse of the frequency.

$$\text{Time period} = \frac{1}{\text{Frequency of oscillation}} = \frac{1}{10} = 0.1 \text{ s}$$

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 6:

The time required to complete one oscillation is known as time period. It is given by the inverse of the frequency.

$$\text{Time period} = \frac{1}{\text{Frequency of oscillation}}$$

Frequency of oscillations = 500 Hz

$$\text{Time period} = \frac{1}{500} = 0.002 \text{ s}$$

Question 7:

Identify the part which vibrates to produce sound in the following instruments.
(a) *Dholak* (b) *Sitar* (c) Flute

Answer 7:

(a) *Dholak* is a musical instrument. It consists of a stretched membrane called its head. When the head is beaten gently, the stretched membrane sets into vibration. Since sound is produced when an object vibrates, the *dholak* produces a sound.
(b) *Sitar* is a musical instrument. It consists of stretched strings. When a string is plucked, it sets into vibration. Since sound is produced when an object vibrates, the *sitar* produces a sound.
(c) Fluteis a hollow pipe. When air is blown over its mouth, the air inside the pipe is set into vibration. As a result, a pleasant sound is produced.

Question 8:

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

Answer 8:

The sound that is pleasing to the ear is called music. For example, the sound produced by violins, pianos, flutes, *pungs*, etc.
The sound that is unpleasing to the ear is called noise.
Some examples of noise are as follows:
(i) Sound produced by horns of buses and trucks
(ii) Sound of electrical generators
(iii) Sound of a gun shot
(iv) Sound produced by jackhammers
Yes. Music can become noise when played at high volumes.

Question 9:

List sources of noise pollution in your surroundings.

Answer 9:

Some sources of noise pollution are as follows:
(i) Televisions and transistors running at high volumes
(ii) Loudspeakers and crackers
(iii) Horns of buses, cars and trucks
(iv) Home appliances such as mixer, desert cooler, etc.

Question 10:

Explain in what way noise pollution is harmful to human.

Answer 10:

Noise pollution can lead to a number of health-related problems. Some of them are as follows:
(i) Hearing loss
(ii) Insomnia; inability to sleep
(iii) Hypertension
(iv) Severe headache
(v) Stress

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 11:

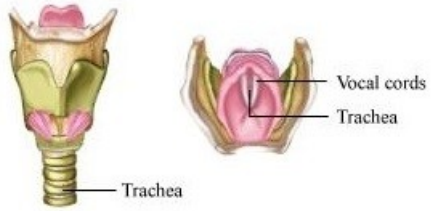
There will be more noise in the house which is along the roadside. This is because noise produced by transportation vehicles may cause trouble to the residents. The intensity of noise decreases with the distance between the source and the listener. Hence, it is better to take the house that is three lanes away from the roadside.

Question 12:

Sketch larynx and explain its function in your own words.

Answer 12:

Larynx is a part of the throat. It is responsible for production of sound. A sketch of a human larynx is shown in the following figure.



Side view of Larynx **Top view of Larynx**

Larynx moves when we swallow something. Inside the larynx, there are two vocal cords. There is a small gap between them. This small gap allows air to pass through. When we speak, air is forced into this small gap by the lungs. This prompts vocal cords to vibrate. Since vibrating objects produce sound, sound is produced due to the vibration of vocal cords.

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 13:

The speed of sound is less than the speed of light. Hence, light reaches us before the sound during a lightning, which is accompanied by thundering.