Chapter 11 Sound Class 9 Important Questions NCERT Science

Question.1 Distinguish between transverse and longitudinal waves. (Three points) [SAII-2014]
Answer.
Transverse waves
(a) Particles the medium vibrate at right angles.
(b) Alt. crests and troughs formed.
(c) e.g., water wavesv
Longitudinal waves
(a) Particles vibrate parallel to the direction of waves.
(b) Alt. compressions, rarefaction formed.
(c) e.g., sound waves.

Question.2 State three characteristics of a musical sound. On what factors do they depend. [SAII-2014]
Answer.
Characteristics of musical sound are:

- Loudness-Amplitude affect loudness-more amplitude loud/Less amplitude soft sound.
- Pitch-frequency affects pitch-more frequency more pitch, Less freq. less pitch.
- Quality or Timhpr.

Question.3
(a) The sound of which of the following frequencies are audible to human ears : 2 Hz, 5 Hz, . 20 Hz, 200 Hz, 2000 Hz.
(b) How [paths of, certain families are able to escape capture ? [SAII-2014]
Answer.
(a) 20 Hz, 200 Hz and 2000 Hz.
(b) They do not reflect the ultrasounds sent towards them by bats.

Question.4 How does the sound produced by a musical instrument, reach your ears? Astronauts need radio transmitter to talk to each other on moon. Why ? [SAII-2014]
Answer. The sound produced by the musical instrument makes the molecules of air vibrate. These vibrations are carried forward by the other molecules till they reach our

ear. These then vibrate our eardrum to produce sound. Since sound requires a medium to propagate, therefore, sound cannot travel between astronauts on the moon, hence they use radio transmitters.

Question.5 How does the sound produced by a vibrating object in a medium reach your ear?

Answer. Air is the commonest material through which sound propagates. When vibrating objects, like prongs of a tuning fork move forward, they push the molecules of the air in front of them. This in turn compresses the air, thus, creating a region of high pressure and high density called compression. This compression in the air travels forward. When the prongs of the tuning fork move backward, they create a region of low pressure in the air, commonly called rarefaction. This region has low pressure, low density and more volume. As the tuning fork continues to vibrate, the regions of compression in the air alternate with the regions of rarefaction. These regions alternate at the same place. The energy of vibrating tuning fork travels outward. This energy which reaches the ears, makes the eardrums to vibrate and thus we hear sound.

Question.6 What are wavelength, frequency, time period and amplitude of a sound wave? [SAII-2013]

Answer. Wavelength: It is the linear distance between two consecutive compressions or two consecutive rarefactions.

Frequency: The number of compressions or rarefactions taken together passing through a point in one second is called frequency.

Time period : It is the time taken by two consecutive compressions or rarefactions to cross a point.

Amplitude: It is the magnitude of maximum displacement of a vibrating particle about its mean position.

Question.7 Does sound follow the same laws of reflection as light does? Explain. [SAII-2010]

Answer. Yes, sound and light follow the same laws of reflection given below :

(a) Angle of incidence at the point of incidence = Angle of reflection.

(b) At the point of incidence, the incident sound wave, the normal and the reflected sound wave lie in the same plane.

Question.8 Explain the working and application of SONAR ?

Answer. SONAR is a device for determining water depth and locating underwater objects like reefs, submarines and schools of fish. To find the depth of an ocean, a strong ultrasonic wave is sent from the ship towards the bottom of ocean.

On striking the bottom of the ocean, the ultrasonic wave is reflected upward toward the ship. This wave is received by a suitable receiver. The time of travel from the source of sound to the receiver is noted. We can calculate the depth of ocean floor if the velocity of sound in water is known :

Depth of ocean floor = v x t/2