QUIZ: SOUND-I

PROPAGATION OF SOUND

1. A vibrating tuning fork creates a series of compressions and rarefactions in air. That is how sound produced by a tuning fork reaches us. Which of the following statements is correct in this context?

(a) Compression is the region of low pressure and rarefaction is the region of high pressure.

(b) Compression is the region of high pressure and rarefaction is the region of low pressure.

(c) Compression and rarefaction both are regions of high pressure.

(d) Compression and rarefaction both are regions of low pressure.

2. Consider sound and light waves, which of the following statements is correct?

(a) Both sound and light waves are transverse waves.

(b) Both sound and light waves are longitudinal waves.

(c) Sound waves are transverse waves and light waves are longitudinal waves.

(d) Sound waves are longitudinal waves and light waves are transverse waves.

NATURE OF SOUND WAVES

3. Which one of the following statements is correct about longitudinal and transverse waves?

(a) In both longitudinal and transverse waves, particles of the medium move about their mean positions in a direction parallel to the direction of wave propagation.

(b) In both longitudinal and transverse waves, particles of the medium move about their mean positions in a direction perpendicular to the direction of wave propagation.

(c) In longitudinal waves, particles of the medium move about their mean position in a direction parallel to, and in transverse wave in a direction perpendicular to, the direction of wave propagation.

(d) In longitudinal waves, particles of the medium move about their mean position in a direction perpendicular to, and in transverse wave, in a direction parallel to, the direction of wave propagation.

4. In sound wave, the particles of the medium move

(a) about their position of rest in a direction parallel to the direction of wave propagation.

(b) about their position of rest in a direction perpendicular to the direction of wave propagation.

(c) from one place to another in a direction parallel to the direction of wave propagation.

(d) from one place to another in a direction perpendicular to the direction of wave propagation.

5. A sound wave has a wavelength of 2.0 m. The distance between a centre of compression to the adjacent centre of rarefaction is

(a) 0.5 m
(b) 1.0 m
(c) 1.5 m
(d) 2.0 m.

Answers:

1. (b)

Options:

(a) Compression is a region of high pressure. Hence this option is wrong.

(b) Compression is a region of high pressure and rarefaction is the region of low pressure. Hence this option is correct.

(c) Pressure is high in region of compression but low in region of rarefaction. Hence this option is wrong.

(d) Compression is the region of high pressure. Hence this option is wrong.

Explanation: Compressions are the regions where air particles are crowded together and thereby producing high pressure in that region. Similarly rarefactions are the regions where air particles spread apart and thereby producing low pressure in that region.

2. (d)

Options:

(a) Sound waves are longitudinal waves and not transverse wave. Hence this option is wrong.

(b) Light waves are transverse waves and not longitudinal wave. Hence this option is wrong.

(c) Sound waves are longitudinal and light waves are transverse. Hence this option is wrong.

(d) Sound wave is longitudinal wave and light waves are transverse wave. Hence this option is correct.

3. (c)

Options:

(a) In transverse waves particles of the medium move about their mean position in a direction perpendicular to the direction of wave propagation. Hence this option is wrong.

(b) In longitudinal waves, particles move about their mean position parallel to the direction of wave propagation. Hence this option is wrong.

(c) In longitudinal waves, particles of the medium move about their mean position in a direction parallel to, and in transverse wave in a direction perpendicular to, the direction of wave propagation. Hence this option is correct.

(d) In longitudinal waves particles move about their mean position, in direction parallel to the direction of wave propagation. In transverse wave, particles move about their mean position in a direction perpendicular to wave propagation direction. Hence this option is wrong.

Explanation: In a longitudinal wave, particles of the medium move about their position of rest in a direction parallel to the direction of wave propagation. In a transverse wave, particles move about their position of rest perpendicular to the direction of wave propagation.

4. (a)

Options:

(a) For longitudinal wave particles of the medium move about their mean position in a direction parallel to the direction of wave propagation. And since sound wave is longitudinal wave, hence this option is Correct.

(b) Sound wave is longitudinal wave and in longitudinal waves, particles move about their mean position in a direction parallel to the direction of propagation. Hence this option is wrong.

(c) Particles of the medium do not move from one place to another during wave propagation. Hence this option is wrong.

(d) Particles of the medium do not move from one place to another during wave propagation. Hence this option is wrong.

Explanation: In a sound wave, the particles of the medium move about their position of rest in a direction parallel to the direction of wave propagation. But particles do not move from one place to another in the

medium. In other words, waves do not carry particles of the medium with them.

5. (b)

Options:

(a) The distance between the centre of compression to the adjacent centre of rarefaction is half of the wavelength. Hence this option is wrong.

(b) The distance between a centre of compression to the adjacent centre of rarefaction is half of the wavelength ($\frac{\lambda}{2}$), i.e. 1.0 m. Hence this option is correct.

(c) The distance between the centre of compression to the adjacent centre of rarefaction is half of the wavelength. Hence this option is wrong.

(d) The distance between the centre of compression to the adjacent centre of rarefaction is half of the wavelength. Hence this option is wrong.