

EINSTEIN'S ACADEMY

10TH SCIENCE

UNIT – 5

I Choose the correct answer

8 x 1 = 8

1. When a sound wave travels through air, the air particles
 - a) vibrate along the direction of the wave motion
 - b) vibrate but not in any fixed direction
 - c) vibrate perpendicular to the direction of the wave motion
 - d) do not vibrate
2. Velocity of sound in a gaseous medium is 330 ms^{-1} . If the pressure is increased by 4 times without causing a change in the temperature, the velocity of sound in the gas is
 - a) 330 ms^{-1}
 - b) 660 ms^{-1}
 - c) 156 ms^{-1}
 - d) 990 ms^{-1}
3. The frequency, which is audible to the human ear
 - a) 50 kHz
 - b) 20 kHz
 - c) 15000 kHz
 - d) 10000 kHz
4. The velocity of sound in air at a particular temperature is 330 ms^{-1} . What will be its value when temperature is doubled and pressure is halved!
 - a) 330 ms^{-1}
 - b) 165 ms^{-1}
 - c) $330 \times \sqrt{2} \text{ ms}^{-1}$
 - d) $330 / \sqrt{2} \text{ ms}^{-1}$
5. If the sound wave travels with a frequency of $1.25 \times 10^4 \text{ Hz}$ at 344 ms^{-1} , the wave length will be
 - a) 27.52 m
 - b) 275.2 m
 - c) 0.02752 m
 - d) 2.752 m
6. The sound waves are reflected from an obstacle into the same medium from which they were incident. Which of the following changes?
 - a) speed
 - b) frequency
 - c) wave length
 - d) none of these

7. Velocity of sound in the atmosphere of a planet is 500 ms^{-1} .

The minimum distance between the sources of sound and the obstacle to hear the echo, should be

- a) 17 m
- b) 20 m
- c) 25 m
- d) 50 m

8. Speed of sound in Aluminium is

- a) 5010 ms^{-1}
- b) 5950 ms^{-1}
- c) 6420 ms^{-1}
- d) 331 ms^{-1}

II. Fill up the blanks

2 x 1 = 2

If the energy in a longitudinal wave travels from south to north, the particles of the medium would be vibrating in _____

2. A source of sound is travelling with a velocity 40 km/h towards an observer and emits a sound of frequency 2000 Hz . If the velocity of sound is 1220 km/h , then the apparent frequency heard by the observer is _____

III. True or false:- (If false give the reason)

2 x 1 = 2

- 1. Sound can travel through solids, gases, liquids and even vacuum.
- 2. The velocity of sound is independent of temperature.

IV. Match the following

(2)

- 1. Infrasonic - (a) Compressions
- 2. Echo - (b) 22 kHz
- 3. Ultrasonic - (c) 10 Hz
- 4. High pressure region - (d) Ultrasonography

II Answer briefly

9 x 2 = 18

1. What is the minimum distance needed for an echo?

3. Name three animals, which can hear ultrasonic vibrations.

9. What is a longitudinal wave?

10. What will be the frequency sound having 0.20 m as its wave length, when it travels with a speed of 331 ms^{-1} ?

11. Why does sound travel faster on a rainy day than on a dry day?
12. Air temperature in the Rajasthan desert can reach 46°C . What is the velocity of sound in air at the temperature? ($V = 331\text{ms}^{-1}$)
13. Explain why, the ceilings of concert halls are curved?
14. Mention two cases in which there is no Doppler effect in sound.
15. Two observers are stationed in two boats 4.5 km apart. A sound signal sent by one, under water, reaches the other after 3 seconds. What is the speed of sound in the water?

III Answer in detail.

2 X 4 = 8

16. What are the factors that affect the speed of sound in gases?
17. What is mean by reflection of sound? Explain:
 - a) Reflection at the boundary of rarer medium.
 - b) Reflection at the boundary of denser medium.
 - c) Reflection at curved surfaces.