

Time : 1 hour 30 Minute

STD 9 Science
Chapter Based Test

Total Marks : 50

section A

* Choose the correct option from the given options [7]

1. Ultrasound is of frequency:
(A) Below 20Hz (B) Above 20Hz (C) Below 20kHz (D) Above 20kHz
2. Sound waves transfer:
(A) Only energy not momentum. (B) Energy. (C) Momentum. (D) Both (b) and (c).
3. Before playing the orchestra in a musical concert, a sitarist tries to adjust the tension and pluck the string suitably. By doing so, he is adjusting:
(A) Intensity of sound only. (B) Amplitude of sound only. (C) Frequency of the sitar string with the frequency of other musical instruments. (D) Loudness of sound.
4. The sound propagates in a gaseous medium by:
(A) Transverse waves (B) Longitudinal waves (C) Both (a) and (b) (D) None of these
5. Which one has higher frequency?
(A) Infrasonic sound (B) Ultrasonic sound (C) Audible sound (D) All of the above have same frequency
6. A wave of frequency 10 Hz was observed to have a compression at a particular instance. Two subsequent time intervals when a compression will be repeated are (in seconds)
(A) 10, 20 (B) 0.1, 0.2 (C) 1, 2 (D) Depends on speed
7. A _____ wave has oscillations in the same direction as its motion.
(A) Longitudinal (B) Oscillatory (C) Vibrational (D) Matter

* Do as directed [7]

8. Calculate the frequency of a wave whose time-period is 0.02s.
9. Which term is used to denote a speed greater than the speed of sound?
10. Is the speed of sound more in water or in steel?
11. Name that part of ear which vibrates when outside sound falls on it.
12. Name the physical quantity whose SI unit is 'hertz'.
13. State the general name of the waves on which the particles of the medium vibrate:

In the same direction as wave.

14. What name is given to the sound waves of frequency too high for humans to hear?

section B

*** Answer the Questions in brief**

[10]

1. A person has a hearing range from 20Hz to 20kHz. What are the typical wavelengths of sound waves in air corresponding to these two frequencies? Take the speed of sound in air as 344ms^{-1} .
2. Give two uses of multiple reflection of sound.
3. An echo returned in 3s. What is the distance of the reflecting surface from the source, given that the speed of sound is 342ms^{-1} ?
4. Draw a diagram to represent a sound wave.
5. Why does the amplitude of oscillation get reduced over a period of time? Explain with diagram.

section C

*** Answer the Questions in detail**

[12]

1. How is it that bats are able to fly at night without colliding with other objects?
2. What is the difference between supersonic and ultrasonic?
3. A device called oscillator is used to send waves along a stretched string. The string is 20cm long, and four complete waves fit along its length when the oscillator vibrates 30 times per second. For the waves on the string:
 - a. What is their wavelength?
 - b. What is their frequency?
 - c. What is their speed?
4. Name four ways in which sound can be produced.

section D

*** Answer the Questions in detail [5 marks each]**

[10]

1. What are longitudinal waves and transverse waves? Explain with the help of labelled diagrams.
2. Distinguish between longitudinal and transverse waves.

Section E

*** case study based question.**

[4]

1.
 - o The distance between two consecutive compressions (C) or two consecutive rarefactions (R) is called the wavelength. The wavelength is usually represented by λ (Greek letter lambda). Its SI unit is meter (m).
 - If we can count the number of the compressions or rarefactions that cross us per unit time, we will get the frequency of the sound wave. It is usually represented by ν (Greek letter, nu). SI unit is hertz (symbol, Hz).

- The time taken for one complete oscillation is called the time period of the sound wave. It is represented by the symbol T. Its SI unit is second (s). Frequency and time period are related as follows: $v = \lambda/T$
- The speed of sound is defined as the distance which a point on a wave, such as a compression or a rarefaction, travels per unit time.

speed, $v = \text{distance} / \text{time}$

$$v = \lambda/T = v\lambda$$

(i) SI unit of wavelength

- (a) m
- (b) Hertz
- (c) m/s
- (d) None of these

(ii) SI unit of Frequency

- (a) m
- (b) Hertz
- (c) m/s
- (d) None of these

(iii) Relation between frequency and time is given by

- (a) frequency and time are directly proportional
- (b) frequency and time are inversely proportional
- (c) There is no relation between them
- (d) None of these
- (iv) Define speed of sound. Give its formula in terms of wavelength and frequency
- (v) Define wavelength frequency and time period of longitudinal wave



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