Chapter- 15

Waves

Very Short Answer Type Questions

1) A wave represented by the equation is superposed with another wave to form a stationary wave such that point x = 0 is a node. The equation for the other wave is

(a) $a\cos(kx-\omega t)$ (b) $-a\cos(kx-\omega t)$

(c) $-a\cos(kx+\omega t)$ (d) $-a\sin(kx-\omega t)$ Answer:- _____

2) Two plane harmonic sound waves are expressed by the equations $y_1(x,t)=A\cos(0.5\pi x-100\pi t)$ and $y_2(x,t)=A\cos(0.46\pi x-92\pi t)$. All parameters are in mks system. How many times does an observer hear the maximum intensity in one second?

(a) 04 (b) 06

(c) 08 (d) 10 Answer:- _____

3) A whistle giving out 450 Hz approaches a stationary observer at a speed of 33 m/s. The frequency heard by the observer in Hz (speed of sound = 330 m/s) is

(a) 409 (b) 429

(c) 517 (d) 500 Answer:- _____

4) Velocity of sound in air is 320 m/s. A pipe closed at one end has a length of 1m. Neglecting end corrections, the air column in the pipe can resonate for sound of frequency.

(a) 80 Hz (b) 240 Hz

(c) 320 Hz (d) 400 Hz Answer:- _____

5) For a wave propagating in a medium, identify the property that is independent of the others.

(a) Velocity (b) Wavelength

(c) Frequency (d) All these depend on each other

Answer:- _____

6) The velocity of sond in air at NTP is 330 m/s. What will be its value when temperature is doubled and pressure is halved?

(a) 330 m/s (b) 165 m/s

(c) $330\sqrt{2}\text{m/s}$ (d) 660 m/s Answer:- _____

7) With the propagation of a longitudinal wave through a material medium, the quantities transmitted in the direction of propagation are.

(a) Energy, momenturm and mass (b) Energy

(c) Energy and mass (d) Energy and linear momentum

Answer:- _____

8) The velocity of sound in any gas medium depends upon

(a) Wavelength of sound only (b) Density and elasticity of gas

(c) Intensity of sound waves only (d) Amplitude and frequency of sound

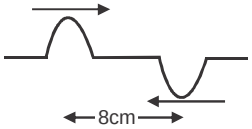
Answer:- _____

9) Velocity of sound waves in air is 330 m/s. For a particular sound wave in air, a path difference of 40 cm is equivalent to phase difference of . The frequency of this wave is

(a) 165 Hz (b) 150 Hz

(c) 660 Hz (d) 330 Hz Answer:- _____

10) two pluses in a stretched string whose centers are initially 8cm apart are moving towards each other as shown in the figure. The speed of each pulse is 2 cm/s. After 2 seconds, the total energy of the pulses will be.



(a) Zero (b) Purely kinetic

(c) Purely potential (d) Purely kinetic and partly potential

Answer:- _____

11) What are the progressive waves?

12) What type of waves are set up in string fixed at one its two ends?

13) Can transverse waves be produced in the air?

14) What is the difference between wave velocity and particle velocity?

15) Why are longitudinal waves also called pressure waves?

16) What is the reason we cannot hear an explosion on Moon?

17) What would be the effect of pressure on the speed of sound?

18) Why does sound travel faster in a rainy day than on a dry day?

19) In the figure shows two vibrating modes of an air column. Find the ratio of frequencies of the two modes.

20) When you shout in front of a hill, your own shout is repeated. Explain?

21) What type of organ pipe will you choose for making a flute and why?

22) What would you hear if you were to move away from a band with the speed of sound?

Short Answer Type Question: 2 marks

23) A wave of wavelength 0.60cm is produced in air and it travels at a speed of 300m/s. Will it be audible?

24) Does the change in frequency due to Doppler Effect depend on the distance between the sources and the observer? Justify

25) Mention the important properties which a medium must possess for the propagation of mechanical waves through it.

Short Answer Type Questions : 3 marks

26) The equation of harmonic wave is given by $y(x,t) = 6\cos 56(t - x/v)m$, where the velocity of the wave is 280m/s. what is the time period and wavelength?

27) A source of the sound of frequency 265 Hz is moving rapidly towards a wall with a velocity of 5m/s. How many beats per second will be heard if sound travels at a speed of 330 m/s

28) The intensities of two waves are in the ratio 1:36. What will be the ratio of their amplitude?

29) What is beat explain it graphically?

30) What do you mean by the second pendulum? Find its length.

31) A rocket is moving away from the earth at a speed of 6×107 light of wavelength 4600A0

Long Answer Type Questions: 5 marks

32) What are the beats? Explain their formation analytically. Prove that the beat frequency is equal to the difference in frequencies of the two superposing waves.

33) What is the Doppler Effect? What is the apparent frequency of the sound when both the source and observer are moving towards each other?