

Model Question Paper 3

Wave Motion 3

11th Standard

Physics

Reg.No. :

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Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 50

7 x 1 = 7

Part A

1) The velocity of transverse wave in a stretched string is given by

(a) $v = \sqrt{\frac{T}{m}}$ (b) $v = \sqrt{\frac{m}{T}}$ (c) $v = \sqrt{T \cdot m}$ (d) $v = \sqrt{\frac{E}{P}}$

2) The velocity of longitudinal waves in an elastic medium is

(a) $v = \sqrt{\frac{T}{m}}$ (b) $v = \sqrt{\frac{E}{\rho}}$ (c) $v = \sqrt{\frac{q}{\rho}}$ (d) $v = \sqrt{\frac{k}{\rho}}$

3) The velocity of longitudinal wave in a solid rod is

(a) $v = \sqrt{\frac{q}{\rho}}$ (b) $v = \sqrt{\frac{k}{\rho}}$ (c) $v = \sqrt{\frac{E}{\rho}}$ (d) $v = \sqrt{\frac{T}{m}}$

4) The velocity of longitudinal wave in liquid is

(a) $v = \sqrt{\frac{T}{m}}$ (b) $v = \sqrt{\frac{E}{\rho}}$ (c) $v = \sqrt{\frac{q}{\rho}}$ (d) $v = \sqrt{\frac{k}{\rho}}$

5) waves do not require any material medium for propagation.

(a) mechanical (b) electromagnetic (c) matter (d) water

6) Mechanical waves propagate through a medium which possesses

(a) elasticity only (b) inertia only (c) both (a) or (b) (d) neither (a) or (b)

7) Longitudinal waves can be propagated through

(a) liquids (b) gases (c) solids (d) any one of these

Part B

8) Define progressive wave.

9) What are longitudinal waves? Give few examples.

10) What are transverse waves? Give example

11) State the conditions under which mechanical and electromagnetic waves can be propagated through a medium.

Part C

12) Illustrate with the example the formation of longitudinal waves.

13) Discuss the (i) effect of pressure, (ii) effect of density, (iii) effect of wind on the velocity of sound in gases.

14) The equation for a plane progressive wave is given by

$$y = a \sin 2\pi \left(\frac{t}{T} - \frac{x}{\lambda} \right)$$

Discuss the variation of (i) phase with time, (ii) phase with distance.

15) Demonstrate with the help of an experiment how sound waves are refracted. Discuss the application of refraction of sound.

16) Discuss the applications of Doppler effect.

Part D

17) Explain how overtones are produced in an open pipe. show that all harmonics are present in the open pipe.

18) What is doppler effect? Derive the formula for the change in frequency

(i) When the source is approaching and receding from the observe and

(ii) When the source is stationary and observe is moving towards and away from the source

19) Describe the formation of stationary waves in a stretched string using sonometer and hence obtain expressions for fundamental frequency and overtones in stretched string.

20) How will you determine the velocity of sound in air at room temperature using resonance column apparatus.
