

## WAVES

**General Instructions:** Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer.

### Test Paper-I

**MAX MARKS: 30**

**TIME: 90Mts**

- |    |   |      |   |
|----|---|------|---|
| 1  | What are waves?   | P363 | 1 |
| 2  | How can you say that Communication involves different kinds of waves?   | P363 | 2 |
| 3  | What are the differences between mechanical waves and electromagnetic waves   | P364 | 2 |
| 4  | What are matter waves? Give any one application of these waves?   | P364 | 2 |
| 5  | Explain briefly how propagation of sound waves takes place in air?  | P364 | 2 |
| 6  | Give the differences between longitudinal and transverse waves  | P366 | 2 |
| 7  | Why transverse waves are possible in solids and strings but not in fluids   | P366 | 1 |
| 8  | Find the type of waves that can propagate through the following media<br>(a) Water (b) Air (c) steel  | P366 | 3 |
| 9  | A steel bar propagates both longitudinal and transverse waves. Do they travel with the same speed? Give your answer with proper reason.                       | P366 | 2 |
| 10 | Given below are some examples of wave motion. State in each case if the wave motion is transverse, longitudinal or a combination of both.                     | P366 | 2 |
|    | a. Motion of a kink in a longitudinal spring produced by displacing one end of the spring sideways.   |      |   |
|    | b. Waves produced in a cylinder containing a liquid by moving its piston back and forth.  |      |   |
|    | c. Waves produced by a motorboat sailing in water.  |      |   |
|    | d. Ultrasonic waves in air produced by a vibrating quartz crystal.  |      |   |
| 11 | Give the equation representing the displacement of a progressive wave specifying the terms involved in it. Also give the graphical plot representing the same | P366 | 3 |
| 12 | Define the following terms with respect to a progressive wave   | P367 | 2 |
|    | a. Amplitude  |      |   |
|    | b. phase  |      |   |
|    | c. Wavelength and   |      |   |

d. wavenumber

13 Define the following terms 3

(a) Time Period (b) Angular frequency (c) Frequency P368

Also give the SI unit of the quantities

14 A wave travelling along a string is described by

$y(x, t) = 0.005 \sin(80.0x - 3.0t)$ , in which the numerical constants are in SI units.

Calculate (a) the amplitude (b) the wavelength (c) the period and frequency of the P368 3

wave. Also, calculate the displacement  $y$  of the wave at a distance  $x = 30.0\text{cm}$  and time  $t = 20\text{s}$  ?