

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-II

MAX MARKS: 40

TIME: 120Mts

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| 1 | Derive an expression to find the speed of a travelling wave. Also state the factors on which the speed of a mechanical wave depends upon | P369 | 3 |
| 2 | The speed of a transverse depends on mass density ' μ ' and tension 'T' in the string. Using dimensional analysis derive an expression to find the speed of a transverse | P370 | 2 |
| 3 | A steel wire 0.72m long has a mass of 5.0×10^{-3} kg. If the wire is under a tension of 60 N, what is the speed of transverse waves on the wire? | P370 | 2 |
| 4 | Given that the speed of a longitudinal wave depends on bulk modulus 'B' and density ' ρ ' of the medium, using dimensional analysis derive an expression to find the speed of a longitudinal wave. | P371 | 2 |
| 5 | Derive the Newton's formula to find the speed of a longitudinal wave in an ideal gas. What is the Laplace correction in obtaining the speed of sound in air? | P372 | 3 |
| 6 | Estimate the speed of sound in air at standard temperature and pressure. The mass of 1 mole of air is 29.0×10^{-3} kg. Also obtain the speed of sound in air by applying the Laplace correction. Given that $\gamma = \frac{c_p}{c_v} = \frac{7}{5}$ for air. | P372 | 3 |
| 7 | State and explain the principle of superposition of waves. Give the equation of the waves that produce the phenomenon of interference. Also | P373
P374 | 3 |
| 8 | state what is the nature of the waves that produce constructive interference and destructive interference? What is the difference between the constructive and destructive interference. | | 3 |
| 9 | How the reflected wave differs from the incident wave? Give the equations representing the incident wave and the reflected wave. Also state what difference do you find when an incident wave is reflected from an open boundary and a close boundary. | P375 | 3 |

- 10 What are standing waves? Give the equations which can produce standing waves on superposition of waves. Give the characteristics of the stationary waves or standing waves. P375 3
- 11 Derive the expression for finding the harmonics of the waves produced for a stretched string fixed at both the ends. Also show diagrammatically the first five harmonics of vibrations for the same. P378 3