Code No. 7031/E

FACULTY OF SCIENCE

B.Sc. II-Semester (CBCS) Examination, May / June 2018

Subject : Physics

Paper – II : Waves and Oscillation

Time : 3 Hours **Max. Marks: 80**

PART – A (5 x 4 = 20 Marks)
(Short Answer Type)
Note : Answer any FIVE of the following questions.

1 What are Lissajous figures? Mention their applications.
2 A simple harmonic wave is represented by $y = 5 \sin 2\pi[(t/0.05) - 0.05x]$cm. Find its wavelength, amplitude and frequency.
3 Define Q-factor. Explain sharpness of resonance.
4 The amplitude of an oscillator of frequency 200 per second falls to 1/ 10 of its initial value after 2000 cycle. Calculate its relaxation time.
5 Write the laws of transverse vibrations of the strings.
6 A steel wire 50cm long has mass of 5 gm it is stretched with a tension of 400N. Find the frequency of the wire in fundamental mode of vibration.
7 Obtain an expression for the frequency of a vibrating bar clamped at both ends.
8 A rod of material with density $8gm/cm^3$ and youngs modules $7.2x10^{11}$ dynes cm^{-2} produces longitudinal waves of frequency 300 Hz. Find the wave length of the waves produced.

PART – B (4 x 15 = 60 Marks)
(Essay Answer Type)
Note: Answer all the questions.

9 (a) Define simple harmonic motion. Obtain an expression for rigidity modulus of the material of a given wire using torsional pendulum.

OR

(b) Discuss the effect of combining two mutually perpendicular simple harmonic vibrations of same frequency.

10 (a) Define damped harmonic oscillator and derive the differential equation of damped harmonic oscillator and obtain its solution under over damped condition.

OR

(b) What are forced vibrations? Obtains an expression for the amplitude resonance and velocity resonance of a forced oscillator.

11 (a) Discuss the modes of vibration of a stretched string clamped at both the ends.

OR

(b) Derive the equation for the velocity of transverse wave along a stretched string.

12 (a) Derive the transverse wave equation in a bar and discuss its solution.

OR

(b) Obtain wave equation and its solution for longitudinal waves in a bar. Discuss the vibration when the bar is fixed at both ends.

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