

4. Define relaxation time of damped oscillator. Show that it varies inversely as a damping constant in mechanical and electrical oscillator.
5. Write down the equation of forced mechanical oscillator being driven by an alternating force $F_0 \cos \omega t$. Explain the transient and steady state behavior of a forced oscillator.
6. Two LC circuits are coupled by mutual inductances. Discuss the behavior of coupled system and find the frequency of coupled system.
7. What do you mean by characteristic impedance of a string ? Derive the expression for it.
8. (a) Differentiate between the stationary and progressive waves.
(b) Prove that the wave equation in case of transverse wave on a string is given by :

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 y}{\partial t^2}$$

Where $c = \sqrt{(T/\rho)}$, T is tension and ρ is linear density.

Exam. Code : 103202
Subject Code : 1268

B.A./B.Sc. 2nd Semester

PHYSICS

(Vibration and Waves)

Paper—B

Time Allowed—2 Hours] [Maximum Marks—35

Note :— There are *eight* questions of equal marks. Candidates are required to attempt any *four* questions.

1. What is electrical oscillator ? Compare it with Mechanical oscillator. Set up the differential equation for this oscillator.
2. A particle is acted simultaneously by two SHMs of the same period but of different amplitudes and phases in perpendicular directions. Find the expression for resultant motion. What is the condition that the path may be straight, ellipse or circle ?
3. What are damped vibrations ? Derive the differential equation for damped SHM and its solution. Discuss the types of damping in SHM.