



**ACE**  
Engineering College  
(with a Difference in Excellence)

An AUTONOMOUS Institution

Question Paper Code:

PH 103BS

ACE-R20

**Semester End Examination**  
**I B. Tech- I Semester Regular/ Supply - JUNE-2022**  
**Engineering Physics**  
**(Common to CE, MECH)**

Time: 3 Hours

Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1. a)	Derive equations of motion in polar coordinates.	8
b)	Explain constraints and friction.	6
2. a)	Derive the differential equation of damped harmonic system.	8
b)	Discuss the conditions for over damping and critical damping of a system subjected to damping force.	6
3. a)	Derive an equation for electrical oscillator.	7
b)	Give electrical analogy to mechanical oscillator.	7
4. a)	Derive the equation for the velocity of transverse wave along a stretched string.	10
b)	Calculate the speed of transverse waves in a wire of $1\text{mm}^2$ cross-section under its tension produced by 0.1kg weight. (Specific gravity of material of wire = $9.81\text{gm/cm}^3$ and $g = 9.81\text{m/sec}^2$ ).	4
5.	Explain longitudinal wave. Derive an equation for the velocity of longitudinal wave through a cylindrical cube of unit cross sectional area.	14
6. a)	Explain Newton's rings experiment with diagram and derive an expression for radius of curvature of plano-convex lens.	10
b)	In a Newton's rings experiment, diameter of 15th ring was found to be 0.59cm and that of 5th ring is 0.336cm. If the radius of curvature of the lens is 100cm, find the wave length of the light.	4
7. a)	Explain the characteristics of a laser beam.	4
b)	Explain the principle, construction and working of He-Ne laser	10
8. a)	Explain the principle behind the functioning of an optical fiber.	4
b)	Define and derive an expression for acceptance angle for an optical fiber. How it is related to Numerical aperture?	10