

**5251**

**B.Tech. Examination, 2013**

**(First Semester)**

**(C.S. and I.T. Branch)**

**ENGINEERING PHYSICS**

**Paper - I**

**Time : Three Hours]**

**[Maximum Marks : 100**

**Note :-** Attempt any **five** questions. All questions carry equal marks.

- ✓ (a) Discuss the effect of introducing a thin plate in the path of one of the interference beams in a biprism<sup>1</sup> experiment. Deduce an expression for the displacement of fringes. Show how this method is used for finding the thickness of mica sheet? 15
- (b) In a Newton's rings experiment, the diameter of 15<sup>th</sup> ring was found to be 0.590 cm and that of the 5th ring was 0.336 cm. If the radius of the Plane-convex lens is 100 cm then calculate the wavelength of light used.

**[ P. T. O.**

2. (a) Explain the construction and working of a diffraction grating and derive an expression for its resolving power. 10
- (b) Deduce Lorentz transformation equations. 10
3. (a) Describe the construction and working of a Nicol prism. 10
- (b) How circularly polarized light can be produced? 5
- (c) What is Fresnel's theory of optical rotation?
4. (a) What are Einstein's coefficients? Derive a relation between them. 10
- (b) Describe the construction and working of a He-Ne Laser.
- (c) What will be the length of a meter rod appear to be for a person travelling parallel to the length of rod at a speed of  $0.8c$  relative to the rod? 5
5. (a) Derive Schrödinger wave equation in time independent form. 10
- (b) Derive expression for the velocity of matter waves. 5

- (c) Calculate the radius of the first Bohr's orbit using Heisenberg's uncertainty principle. 5
3. (a) Derive Claussius-Mussoti equation. 10
- (b) Explain different types of magnetic materials. 5
- (c) What is acceptance angle for an optical fibre?
7. (a) What is Meissner's effect? How will you differentiate between perfect and superconductor? 8
- (b) Explain different types of polarization mechanism in dielectric materials. 8
- (c) Write a short note on Bucky Balls. 4
8. (a) Derive Maxwell's Equations. 10
- (b) Derive electromagnetic wave equation in free space and calculate intrinsic impedance. 10