Exam. Code : 103203
Subject Code : 1322

B.A./B.Sc. 3rd Semester

PHYSICS

Paper—B (Optics and Lasers)

Time Allowed—3 Hours] [Maximum Marks—35

Note :— Attempt at least **ONE** question each from four Sections A, B, C and D. **Fifth** question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (a) What do you understand by Coherence ?

   (b) Describe the Young's experiment and derive expressions for :

   (i) Intensity at a point on the screen

   (ii) The fringe width.

2. (a) Explain, giving relevant theory, the formation of colours by a thin film in reflected light.

   (b) What change is observed when the thickness of a very thin film is gradually increased ?

SECTION—B

3. Discus the Fraunhofer type of diffraction produced by a narrow single slit of width a and illuminated by a monochromatic light of wavelength [lambda]. Also deduce the positions of Maxima and Minima and plot the intensity distribution curve.

4. Explain Rayleigh's criterion of resolution. Define limit of resolution and resolving power of a telescope.

SECTION—C

5. What do you mean by double refraction ? Distinguish between positive and negative crystals. Give Huygen's theory of double refraction in uniaxial crystals.

6. Explain the construction and use of a quarter wave plate and a half wave plate and give their uses in various types of polarised light.

SECTION—D

7. (a) Explain Einstein's coefficients and derive an expression for finding the ratio of these coefficients.

   (b) What do you mean by broadening of spectral lines ? What are its various causes ?

8. Give detailed information for construction, energy level scheme, mode of working, uses and output characteristics of any of the two lasers :

   (i) Ruby Laser

   (ii) Nd : YAG Laser

   (iii) He-Ne Laser.