Section-A
I. Answer any FIVE of the following questions. (5x4=20 Marks)
1. What are coherent sources? Give two examples.
2. Find the thickness of a soap film($\mu=1.33$)which gives constructive second order interference of reflected red light($\lambda=7000A°$)
3. Distinguish between Fresnel and Fraunhofer classes of diffraction?
4. Write any four differences between a zone plate and a convex lens.
5. Two Nicols are at right angles to each other. Now one of them is rotated through 60° .What % of incident unpolarised light passes through the system?
6. Show that Babinet's Compensator is an improvement over quarter wave plate.
7. A lens of dispersive power 0.0312 is kept in contact with a convex lens of 100cm and dispersive power 0.0624.If the combination works as an achromatic doublet, find the focal length of the first lens.
8. Mention any four advantages of communication with optical fibre.

Section-B
II. Answer the following questions. (4x15=60 Marks)
9. (a) Derive an expression for displacement of fringes when a thin transparent sheet is introduced in the path of one of the interfering beams in biprism. When a thin mica sheet ($\mu=1.6$) is placed in one of the paths, 20 fringes are shifted. If $\lambda=6000A°$, find the thickness of the sheet.
(OR)
(b) Explain the formation of Newton's rings by reflected monochromatic light. Derive equations for the diameters of Newton's bright and dark rings.

10.(a) Describe Fraunhofer diffraction due to a double slit with necessary theory and discuss the intensity distribution.
(OR)
(b) Explain the term half period zone. Calculate the area of a Fresnel zone and show the amplitude due to a complete wave front is just half due to the first half period zone acting alone.

11.(a) What is double refraction? Describe polarization by double refraction using Nicol's prism.
(OR)
(b) Describe a polarimeter and explain how it is used to measure the strength of sugar solution. A 15cm tube containing cane sugar solution (specific rotation 66°) shows optical rotation 7° .Calculate the strength of the solution.

12.(a) What is spherical aberration? How it can be eliminated. Obtain the condition for minimizing spherical aberration in case of two coaxial lenses separated by a distance.
(OR)
(b) Discuss the types of optical fibers based on the number of modes and the refractive index.

*****