LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FIFTH SEMESTER – **NOVEMBER 2024**

PH 5511 – OPTICS

Date: 21-11-2024
Time: 01:00 pm-04:00 pm

Dept. No.

Max. : 100 Marks

SECTION A

Answer ANY FOUR of the following   **4 x 10 = 40 Marks**

1. How does the matrix method simplify the understanding of ray optics, particularly in the context of translation and refraction?

2. Can you explain the causes of lens aberrations, particularly spherical aberrations and astigmatism?

3. What is the principle behind Fresnel's biprism experiment and how is it used to demonstrate interference?

4. How do Fresnel's mirrors and Lloyd's single mirror experiments demonstrate the phenomenon of interference?

5. What is rectilinear propagation of light and how does it relate to diffraction?

6. What is Brewster's Law and how does it relate to polarization by reflection?

7. How do double refraction and Nicol prisms work in the context of polarization?

8. How do resonant cavities enhance LASER performance?

SECTION B

Answer ANY THREE of the following   **3 x 20 = 60 Marks**

9. What purpose do Huygen's and Ramsden's eyepieces serve in optical instruments, and how do they differ?

10. How is chromatic aberration managed in prisms and lenses, and what is the significance of dispersive power and Cauchy's formula?

11. What role does the Michelson interferometer play in the determination of wavelength and refractive index?

12. How does a Fabry-Perot etalon differ from other interferometric devices in terms of its design and function?

13. Explain Rayleigh's criterion and its application in the resolving power of optical instruments.

14. What is optical activity and how is it measured using a Laurent's half-shade polarimeter?

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