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SUBJECT CODE NO: -BB-2428
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (CBCGS) (Pattern 2022) F.Y SEM II
Examination November / December 2025
Physics Paper-IV Optics

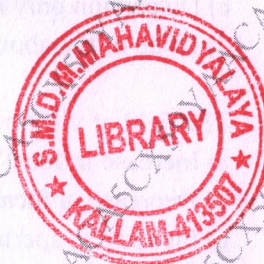
[Time: 1:30 Hours]

[Max. Marks: 40]

Please check whether you have got the right question paper.

N. B

- 1) All questions are compulsory.
- 2) Draw diagram whenever necessary.
- 3) Use Only blue or black pen for writing.

**Q1 Long Answer Questions (Solve any one)****10**

- A. Derive the equation for cardinal points of an optical system with neat diagram.
- B. Compare Ramsden's and Huygen's eyepiece in detail.

Q2 Long Answer Questions (Solve any one)**10**

- A. Discuss chromatic aberration and explain its correction using an achromatic doublet.
- B. Explain formation of Newton's rings and derive the expression for wavelength determination.

Q3 Short Answer Questions / Problems**10**

- A. Derive the lens equation ($\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$) from first principles.
- B. Explain the need of multiple-lens eyepieces in optical instruments.

OR

- A. What is coma aberration? How can it be minimized?
- B. Explain Rayleigh's criterion of resolution.

Q4 Multiple Choice Questions (Attempt all) (Attempt all-each carries 1 marks)**10**

1. The relation between object distance (u), image distance (v), and focal length (f) of a thin lens is:
 a) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ b) $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ c) $\frac{v}{u} = f$ d) $\frac{v}{u} = -f$
2. The six points associated with a lens system are called:
 a) Principal foci b) Cardinal points
 c) Optic centers d) Nodal planes

3. Spherical aberration is minimized by:
 - a) Using stops
 - b) Using plano-convex lens
 - c) Using parabolic lens
 - d) All of the above
4. Chromatic aberration arises due to:
 - a) Refraction of different colors at different angles
 - b) Reflection
 - c) Dispersion only in mirrors
 - d) None of the above
5. The field of view of a magnifier increases with:
 - a) Increase in focal length
 - b) Decrease in focal length
 - c) Increase in aperture
 - d) Decrease in aperture
6. Ramsden's eyepiece is preferred when:
 - a) Large field of view is required
 - b) Reduced spherical aberration is required
 - c) Reduced chromatic aberration is required
 - d) Both (b) and (c)
7. In a wedge-shaped film, fringes are formed due to:
 - a) Refraction
 - b) Diffraction
 - c) Interference
 - d) Dispersion
8. Michelson's interferometer produces:
 - a) Circular fringes
 - b) Straight fringes
 - c) Hyperbolic fringes
 - d) Concentric fringes
9. The resolving power of diffraction grating increases with:
 - a) Increase in number of lines per unit length
 - b) Decrease in number of lines per unit length
 - c) Increase in wavelength
 - d) Decrease in wavelength
10. The resolving power of a prism is maximum for:
 - a) Red light
 - b) Green light
 - c) Blue light
 - d) Depends on dispersion

