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**SUBJECT CODE NO: - YY-2365**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**B.Sc. F.Y. SEM II (CBCGS) (Pattern 2022)**  
**Examination April / May - 2024**  
**Physics Paper - IV Optics Paper**

**[Time: 1:30 Hours]****[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B

- i) All questions are compulsory.
- ii) All questions carry equal marks.
- iii) Draw neat diagrams and give labels wherever necessary.
- iv) Figures to the right indicate full marks.

**Q1** Define and explain with a neat diagram the nodal points of an optical system. **10**

**OR****Explain in brief****10**

- i) What is chromatic aberration? How can it be minimized or eliminated?
- ii) If two planoconvex lenses each having a focal length of 3 cm placed coaxially and are separated by a distance of 3 cm. verify the conditions for minimum spherical aberration and minimum chromatic aberration are satisfied or not.

**Q2** i) Explain the Gauss eyepiece **05**

- ii) In Ramsdens eyepiece focal length of the eye-lens is 6cm, find its equivalent focal length. **05**

**OR****Explain in brief**

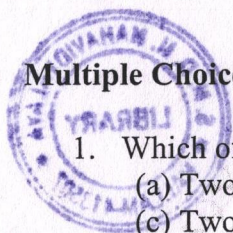
- i) Draw a neat labeled diagram to determine the resolution power of the prism **05**
- ii) The wavelength of two components of D-lines of sodium is 5890 A.U. and 5896 A.U. By how much distance one of the mirrors of Michelson's interferometer be moved so as to obtain consecutive positions of distinctness? **05**

**Q3** Write a short note on (any two) **10**

- i) Principal points of an optical system
- ii) Types of spherical aberration
- iii) Distinguish between Ramsden's Eyepiece and Huygens's eyepiece
- iv) Newton rings by reflected light

**Q4 Multiple Choice Questions**

10



1. Which of the following are known as cardinal points of an optical system
  - (a) Two principal foci
  - (b) Two principal point
  - (c) Two nodal points
  - (d) All of the above
2. The points having unit angular magnification in the lens system are
  - (a) principal foci
  - (b) nodal points
  - (c) principal points
  - (d) cardinal points
3. X is an optical defect due to which a comet-like image is formed instead of a point image. X is \_\_\_\_\_
  - (a) coma
  - (b) astigmatism
  - (c) curvature
  - (d) distortion
4. Two lenses of focal lengths 8 cm and 6 cm are placed a certain distance apart. If they form an achromatic combination, the separation between them is \_\_\_\_\_
  - (a) 5 cm
  - (b) 6 cm
  - (c) 7 cm
  - (d) 8 cm
5. To place cross wire arrangement which eyepiece is correct
  - (a) Huygens eyepiece
  - (b) Ramsden's eyepiece
  - (c) Both a and b
  - (d) None of above
6. The Huygens eyepiece is useful when we want to
  - (a) eliminate spherical aberration
  - (b) eliminate chromatic aberration
  - (c) eliminate both spherical and chromatic aberration
  - (d) none of these
7. If R is the radius of curvature of the plano-convex lens then the radius of Newton's 4<sup>th</sup> dark ring is
  - (a)  $\sqrt{2\lambda R}$
  - (b)  $2\sqrt{\lambda R}$
  - (c)  $\sqrt{\lambda R}$
  - (d)  $4\sqrt{\lambda R}$
8. In Michelson's interferometer if two lenses are exactly perpendicular to each other, then the fringes observed are
  - (a) Circular
  - (b) straight line
  - (c) curved towards the edge of wedge
  - (d) none of these
9. The effective focal length of Ramsden's eyepiece is 3cm. The focal length of a single lens is \_\_\_\_\_
  - (a) 3 cm
  - (b) 4 cm
  - (c) 5 cm
  - (d) 6 cm
10. Resolution power of the prism is
  - (a)  $t * \frac{d\mu}{d\theta}$
  - (b)  $t * \frac{d\mu}{d\lambda}$
  - (c) both a and b
  - (d) none of the above

