

## Optics

**SEM-III**

Time allowed: 3 hrs

Maximum marks: 30

## Section A

- I. Define coherence. What is the difference between spatial and temporal coherence? (5)
- II. Derive the condition for interference produced by reflected light in case of thin films.(5)
- III. What is the principle of Fabry- Perot Interferometer? Explain its working. (5)
- IV. How are Newton's rings formed? Why are these rings concentric and circular in shape? (5)

## Section B

- V. What is zone plate? Show that it behaves like a convergent lens. (5)
- VI. a. What is meant by diffraction of light? (2)
- b. Distinguish between Fresnel and Fraunhofer diffraction. (3)
- VII. Derive an expression for the Fraunhofer diffraction pattern of a circular aperture. (5)
- VIII. a. What is birefringence? (3)
- b. What is the effect of half wave plate on phase retardation. (2)

## Section C

- IX. Attempt any five:
- a. Give two examples each of interference by
    - i) division of wavefront
    - ii) division of amplitude
  - b. Why does an excessively thin film appear black in reflected light?
  - c. How are two coherent sources produced in Michelson interferometer?
  - d. What is Polaroid? Give its uses.
  - e. Differentiate between resolving power and dispersing power of grating.
  - f. What is Rayleigh's criteria of resolution?
  - g. State Malus law. What fraction of light will be emerged for  $\Theta = 45^\circ$ ?