

Physics- PH-302

Paper VI: Wave and optics I

Max. Marks: 40

Internal Assessment: 10

Time: 3 hours

**Note:**

1. The syllabus is divided into 4 units. 9 questions will be set.
2. Question no 1 will be compulsory, it contains 6 parts (form all the four units) and answer should be brief but not in yes / no.
3. Four more questions are to be attempted, selecting one question from each unit. Questions 2-9 may contain two or more parts .All questions carry equal marks.
4. 20% numerical problems are to be set.
5. Use of scientific (non-programmable) calculator is allowed.

**Unit-1: Interference I**

Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference, Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet, Lloyd's mirror, Difference between Bi-prism and Lloyd mirror fringes, phase change on reflection.

**Unit 2: Interference II**

Interference by Division of Amplitude: Plane parallel thin film, production of colors in thin films, classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film, Newton's rings, Interferometer: Michelson's interferometer and its applications to (i) Standardization of a meter (ii) determination of wavelength.

**Unit- 3: Diffraction I**

Fresnel's diffraction: Fresnel's assumptions and half period zones, rectilinear propagation of light, zone plate, diffraction at a straight edge, rectangular slit and circular aperture, diffraction due to a narrow slit and wire.

#### **Unit -4: Diffraction II**

Fraunhofer diffraction: single-slit diffraction, double-slit diffraction, N-slit diffraction, plane transmission grating spectrum, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating. Differences between prism and grating spectra.

#### **References**

- 1 Hecht, Optics, Pearson Education, New Delhi
- 2 Brooker G, Modern Classical Optics, Ane Books Pvt Ltd, New Delhi
- 3 Chaudhuri R N, Waves and Oscillations, New Age International Publishers, New Delhi 4  
Khandelwal D P, Text Book of Optics and Atomic Physics, Himalaya Publishing  
House, Bombay
- 5 Subrahmanyam N, Lal B, Avadhanulu M N, A Text Book of Optics, S Chand & Co, New Delhi
- 6 Barton A w, a text Book on Light, Longmans Green & Co London.
- 7 Longhurst R S, Geometrical and Physical Optics, University Press India Pvt.Ltd. Hyd.