

## UNIT-IV

(18 hrs)

### 1. Interference: (10 hrs)

Principle of Superposition, Coherence and condition for interference, Division of amplitude and division of wave front, Division of wave front – Lloyd's single mirror (determination of wavelength of light of monochromatic source), Division of amplitude- Interference in thin parallel films (reflected light only), Wedge shaped films, Newton's rings and its application for determination of wavelength and refractive index of light.

### 2. Diffraction: (8 hrs)

Fraunhofer diffraction- Elementary theory of plane diffraction grating, Determination of wavelength of light using diffraction grating, Theory of Fresnel's half period zones, Zone plate (construction, working and its properties), Fresnel's diffraction at a straight edge.

#### • Reference Books

1. Text book of optics for B.Sc. Classes- Brij Lal and N. Subrahmanyam, S. Chand & Company Ltd. New Delhi, 2006
2. Wave Optics- R. K. Verma, Discovery Publishing House New Delhi, 2006
3. A text book of light- 8<sup>th</sup> Edition, D. N. Vasudeva, Atma Ram & Sons, Delhi (1976)
4. Fundamentals of Optics- 4<sup>th</sup> Edition, Francis A. Jenkins and Harvey E. White, Tata McGraw-Hill Education Private Ltd., New Delhi 2011
5. Optics- 2<sup>nd</sup> Edition, Ajay Ghatak, Tata McGraw-Hill Publishing Company Ltd., New Delhi,
6. *A text book of light- D. N. Vasudeva*
7. Principles of Physics- 10<sup>th</sup> Edition, Halliday and Resnick, Wiley
8. University Physics- 14<sup>th</sup> Edition, H.D. Young and R. A. Freedman, Pearson

## ➤ B.Sc. Part II PHYSICS LAB Experiments (DSC C1, C2, D1, D2 Paper V, VI, VII, VIII)

**Total Marks: 100 Credits: 04**

#### • Group I (Thermal Physics and Statistical Mechanics I)

1. To determine the value of Stefan's Constant.
2. To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
3. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
4. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
5. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
6. To study the variation of thermo e.m.f. across two junctions of a thermocouple with temperature.
7. To record and analyze the cooling temperature of hot object as a function of time using a thermocouple.
8. To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge

#### • Group II (Thermal Physics and Statistical Mechanics II)

1. To determine the temperature coefficient of resistance using post office box.
2. To verify Stefan's fourth power law.

3. To determine specific heat of graphite.
4. To determine the ratio of specific heat of air by Kundt's tube.
5. Temperature of flame
6. To determine the coefficient of thermal conductivity of glass in the form of tube.
7. To determine the thermal conductivity of metal bar by Forbes's method.
8. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.

- **Group III( Waves and Optics I)**

1. To investigate the motion of coupled oscillators
2. To determine the frequency of an electrically maintained tuning fork by Melde's experiment and to verify  $\lambda^2 - T$  Law
3. To study Lissajous figures by using CRO
4. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's method)
5. To determine velocity of sound in air by Kundt's tube and audio oscillator or Phase shift method (CRO and microphone).
6. To determine viscosity of liquid by Searle's viscometer.
7. To determine velocity of sound in air by resonating bottle.
8. To determine frequency of a crystal oscillator.

- **Group IV( Waves and Optics II)**

1. To determine the Resolving Power of a Prism.
2. To determine the Resolving Power of a Plane Diffraction Grating.
3. To determine wavelength of sodium light using diffraction due to straight edge.
4. To determine wavelength of sodium light using Newton's Rings.
5. Determine thickness of thin film using interference in wedge shaped thin film.
6. Goniometer I- To study cardinal points of optical system
7. Goniometer II- To study the equivalent focal length of optical system.
8. To study angle of specific rotation of sugar using Polarimeter.

- **Reference Books for practical**

1. Advanced Practical Physics for students, B.L. Flint & H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. B.Sc. Practical Physics, C.L. Arora, S. Chand & Company Pvt. Ltd., New Delhi