

Bachelor of Science
First B.Sc. (Hons.) Physics, Semester-I
CC : PHY-103

Unit – I

(a) Acceleration due to Gravity and Motion in a central force field :

Compound Pendulum (6.4), Bar- Pendulum (6.9) Equivalent One body problem (5.1), Motion in a central force field (5.2), General features of the Motion (5.3), Motion in a inverse square law force field (5.4), Equation of the orbit (5.5), Kepler's Laws of planetary motion (5.6)

Basic reference:

1. Elements of Properties of Matter By D.S.Mathur (S.Chand & Company Ltd.)
2. Introduction to Classical Mechanics by Takwale & Puranik Tata McGraw-Hill Publication

(b) Mechanics of a Single Particle and Mechanics of a system of particles:

Motion of a Particle Subjected to a Resistive Force (3.3(d) [1 to 5]), Mechanics of a system of particle (3.5), Motion of system with variable mass (3.6)

Basic reference:

Introduction To Classical Mechanics By R.G.Takwale & P.S.Puranik (Tata McGraw-Hill Publishing Company Ltd.)

Other reference:

1. Mechanics & Electrodynamics By Brij lal, N.Subrahmanyam & Jivan Seshan – (S.Chand & Co.)
2. Classical Mechanics by Goldstain (Narosa Pub.)

Unit – II

(a) Refraction Through Lenses:

Principal Foci (2.3), Equivalent Focal Length of Two Thin Lenses Separated by a Finite Distance (2.6), Cardinal Points of an Optical system (2.8), Principal Foci and Focal Planes (2.9), Principal Points and Principal Planes (2.10), Nodal Points (2.11) Aberrations(3.1), Spherical aberration in a Lens (3.5), Chromatic aberration (3.12).

(b) Interference:

Interference in thin films (8.15), Interference due to reflected light (8.16), Interference due to transmitted light (8.17), Newton's Rings (8.23), Determination of the wavelength of sodium light using Newton's Rings (8.24), Refractive Index of a Liquid using Newton's Rings (8.25)

Other reference:

1. Optics and Atomic Physics By D.P.Khandelval (Himalaya publishing house)
2. Principles of Optics By B.K.Mathur (S.Chand & Company Ltd.)
3. Optics By Ajoy Ghatak (TMH Edition)

Unit – III

(a) Electrostatics:

Gauss's Law (4.21), Gauss's Law in Differential Form (4.22), Gauss's Law and Coulomb's Law (4.23), Force on The surface of a charged Conductor (4.25), Electrostatic Energy in the medium surrounding the charged conductor (4.26), Millikan's Oil drop Method for Determination of Electronic charge (4.29),

(b) Steady Current:

Current and current density (8.6), Conservation of Charge i.e., Continuity Equation (8.8), Ohm's Law at a Point (8.11), Wiedmann and Franz Law (8.13), The Relaxation Time (8.14),

Other reference:

1. Electricity and Magnetism by Mahajan and Rangwala.
2. Electricity and Magnetism - Berkley Physics Course Vol-II

Unit – IV

(a) Waves:

Theory of Resonator (6.16), Dependence of the Frequency of Resonator on the size and the Shape of the Mouth (6.17), Velocity of Transverse Waves along a Stretched String (7.1), Laws of Transverse Vibration of Strings (7.3), Melde's Experiment (7.5), Kundt's Tube (7.13)

(b) Sound:

Musical Sound and Noise (7.16), Speech (7.17), Human voice (7.18), Human Ear (7.19), Characteristics of Musical Sound (7.20), Intensity of Sound (7.21), Measurement of Intensity of sound – Decibel and Phon (7.22), Bel (7.23), Phon (7.24)

(c) Ultrasonic waves:

Ultrasonics (11.23), Production of Ultrasonic Waves (11.24), Piezo-Electric Oscillator (11.24.3), Detection of Ultrasonic Waves (11.25), Applications of Ultrasonic waves (11.27)

Basic reference: For (a) , (b) & (c)

Waves and Oscillations By N.Subrahmanyam and Brij Lal (Vikas Publishing House Pvt. Ltd., New Delhi) – Second Revised Edition.

Other reference:

1. University Physics By Sears, Zeemansky and Young (Narosa Publishing House)
2. A Text Book on Ocillations, Waves and Acoustics By M.Ghosh & D.Bhattacharya (S.Chand)
3. Vibration, Waves & Heat By Sears and Zeemansky

CC:PHY-104
Sem-II
Laboratory Experiments
Group-I

1. Bar Pendulum : Determination of 'K' and 'g'
2. Double Refraction by Calcite prism.
3. Newton's rings : Determination of R and l using sodium light.
4. Melde's Experiment.
5. Refractive Index of Prism.
6. Study of line spectra.
7. To determine the ratio of magnetic moments of two magnets by using vibrational magnetometer.

Group-II

1. Determination of self inductance 'L' of Inductor.
2. Study of parallel resonance with frequency variation.
3. Study of transformer.
4. P-N Junction diode as Full Wave Rectifier (i) Without filter (ii) With Series inductor Filter (iii) With Shunt Capacitor Filter. Calculation of percentage of regulation.
5. Bridge Rectifier (i) Without filter (ii) With Series inductor Filter (iii) With Shunt Capacitor Filter. Calculation of percentage of regulation.
6. Verification of Maximum power transfer theorem.
7. Basic Logic Gates AND , OR , NOT