

CC – I – ELECTRICITY AND MAGNETISM

Unit – I: Electrostatics

Gauss's theorem and its applications – Coulomb's theorem – Force on the surface of a charged conductor – Electrostatic energy per unit volume in the medium.

Capacitors : Capacity of a conductor – Energy of a charged conductor – Principle of a capacitor – Capacity of spherical and cylindrical capacitors – Capacitors in series and in parallel – Sharing of energy between two capacitors.

Unit – II: Magnetic Effects of Electric Current.

Ampere's theorem and its applications – Field along the axis of a circular coil and solenoid – Force on a conductor placed in a magnetic field – Theory of moving coil galvanometer and ballistic galvanometer - Figure of merit.

Unit – III: Current Electricity.

Electromagnetic Induction: Faraday's laws – Lenz's law – Fleming's right hand thumb rule – Self inductance – Self inductance of a long solenoid – Experimental determination of self inductance by Rayleigh's DC bridge method – Mutual inductance – Mutual inductance between two solenoids – Determination of mutual inductance – Eddy current – Skin effect – Choke Coil.

Electrical measurements : Potential difference – Electric current – Ohm's law – Resistance – Resistances in series and in parallel – Ammeters and voltmeters – Kirchhoff's laws.

Unit – IV : Magnetic and Electric Properties of Materials.

Susceptibility and Magnetisation – Dia, para and ferro magnetic materials. Hysteresis – Experimental method for B-H curve – Energy loss.

Insulators and conductors – resistivity – metals and thermistors

Unit – V : X-Rays

Production and properties of X-rays – Uses – Miller indices – Two and three dimensional Bravais lattices – Structures of simple substances – Diamond, NaCl, CsCl and ZnS – Crystal Structure determination by Laue's powder photograph and rotating crystal methods.

Books for Study :

1. Electricity and Magnetism – Brijlal and Subrahmanyam – Ratan Prakashnan Mandir – 1995.
2. Modern Physics – R. Murugesan – S.Chand & Co., 1994.

Books for References:

1. Electricity and Magnetism – D.N. Vasudeva – S.Chand & Co.,
2. Electricity and Magnetism–Khare and Srivastava – Atmaram and sons – New Delhi.
3. Modern Physics – J.B. Rajam – S.Chand & Co.