*Unit I – Electrostatics (17)*

* Electric Dipole Moment.
* Expression of electric field intensity due to electric dipole at equatorial and axial positions.
* Expression of torque at a dipole placed at any point in electric field.
* Expression of work done in rotating a dipole in uniform electric field.
* Expression of work done to rotate the dipole from stable to unstable equilibrium in uniform electric field.
* Gauss Law + 3 Applications
* Expression of electric field intensity on the surface of charged conductor.
* Expression for capacitance of a parallel plate capacitor + energy stored in capacitor.
* Expression of capacitance of parallel plate capacitor having partially dielectric slab introduced.

*Unit II – Current Electricity (12)*

* Drift Velocity + Mobility
* Factors affecting resistance and resistivity + Graphs
* EMF, internal resistance, terminal voltage + (relation).
* Wheatstone bridge (principle).
* Meter bridge conceptual.
* Potentiometer (principle + sensitivity).
* Circuit diagram to determine internal resistance of primary cell using Potentiometer.

*Unit III – Magnetic effect of current & Magnetism (18)*

* Biot-Savart law + vector form + derivation.
* Expression of Magnetic Field Induction at the center of a circular current carrying coil.
* Magnetic Moment + Ampere’s circuital law.
* Cyclotron + velocity selector.
* Limitations of Cyclotron.
* Expression of force acting on a current carrying conductor placed in a Magnetic Field.
* Expression of force per unit length acting on two parallel current carrying conductor + define 1 Ampere.
* Expression of torque acting on a current carrying coil placed in Magnetic Field.
* Moving Coil Galvanometer (principal + derivation)
* Shunt + uses of shunt.
* Conversion of Galvanometer into ammeter and voltmeter.
* Expression of Magnetic Moment associated with an atom due to orbital motion of electron + define Bohr’s magneton.
* Show that current carrying Solenoid behaves like a bar magnet.
* Dia, Para & Ferromagnetism.

*Unit IV – EMI & AC (17)*

* Lenz law is in accordance with the law of conservation of energy. Explain.
* Motional EMF
* Motional EMF by Lorentz Force. Prove e=BlvSin**θ**
* Self-Inductance + Expression for long Solenoid.
* Transformer (Principle + Derivation)
* Define mean value of A.C and derive it.
* Define mean value of EMF of AC and derive.
* AC Circuit with Capacitance only – Current leads by π/2
* AC Circuit with Inductor only – Voltage leads by π/2
* RL circuit in AC
* RC circuit in AC
* LC circuit in AC
* LCR circuit in AC
* Resonance with conditions.
* RMS value of AC
* Quality Factor.
* Power in LCR circuit.
* Power in AC circuit with only R
* Power in AC circuit with only C
* Power in AC circuit with only L
* Power in AC circuit with R and L
* Power in AC circuit with R and C
* Power in AC circuit with L and C
* AC Generator (Principle + Derivation)

*Unit V – EM Waves (6)*

* Displacement Current.
* Maxwell’s modification of Ampere’s Law.
* Properties of EM Waves.
* EM Waves Spectrum.
* Representation of EM Wave travelling along (z or any other) axis.