

**Unit - I**

**Chapter 1 : Fundamental Concepts of DC Circuits**

**1-1 to 1-36**

**Syllabus** : Electric potential, EMF, Current, Power and Energy. Conductor, Semiconductor and Insulator-properties and Applications. Resistor, Inductor and Capacitor. **Resistor**, Properties and Practical applications, Classification based on ohmic value and material, Effect of temperature on resistance and temperature coefficient of resistance. Conductance, Conductivity, Current density. **Ohm's law** : Applications and limitations. Kirchhoff's voltage law and Kirchhoff's current law. Joule's law of heating, Applications. Power and Energy, Unit conversion from mechanical to electrical and vice-versa, Impact of using electrical source over the other energy sources on the environment.

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**Unit - II****Chapter 2 : Network Solution Techniques 2-1 to 2-28**

**Syllabus :** Node, Branch, Loop, Mesh ; Open, Closed and Short circuit. Series and Parallel connections of resistors and equivalent resistance. Source transformation techniques. Mesh analysis, Nodal Analysis. Duality in electrical networks.

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**Unit - III****Chapter 3 : Network Theorems 3-1 to 3-30**

**Syllabus : Types of electric circuits :** Active and Passive, Linear and Nonlinear, Unilateral and Bilateral circuit. Superposition theorem, Equivalent circuit. Thevenin's theorem, Equivalent circuit. Norton's theorem, Equivalent circuit. Maximum power transfer theorem. 'T' to 'Pi' network conversion (Star-Delta transformation) and 'Pi' to 'T' network conversion (Delta-Star transformation).

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**Unit - IV****Chapter 4 : Capacitors & Its Applications 4-1 to 4-40**

**Syllabus : Capacitor :** Function, Types, Applications, Capacitance, Capacitive reactance, Factors affecting capacitance. Behaviour of capacitors in DC circuits, Charging and Discharging of capacitor, RC time constant, Energy stored in capacitor. Series and Parallel combination of capacitors. Capacitance of parallel plate capacitor and Spherical capacitor. Batteries, Ratings, Types and Their comparison. Identification of weak battery in series and Parallel combination. Recycling, Disposal of old capacitors and Batteries safely.

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**Unit - V****Chapter 5 : Magnetism & Electromagnetism 5-1 to 5-40**

**Syllabus :** Flux, Flux density (B), Magnetic field intensity (H), M.M.F, Magnetic lines of force, Permeability, Hysteresis loop, Reluctance, Leakage factor, B-H Curve. Comparison of magnetic and Electric circuit. Electromagnetism, Electromagnetic field around a current carrying conductor. Faraday's laws of electromagnetic induction, Fleming's right and left-hand rule, Lenz's Law. Induced EMF, Self (Static and Dynamically induced emf) and Mutually induced emf and Their applications. Self and Mutual inductance, Inductive reactance, Coefficient of self and Mutual inductance. Inductance in series and Parallel.

**Inductors :** Function types, Construction and Applications, Energy stored in an inductor.

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