

BASIC ELECTRICAL ENGINEERING

Chapter 1: DC Circuits

1. Define Ohm's law. What is the limitation of ohm's law?
2. Explain Kirchhoff's current and Kirchhoff's voltage law?
3. Difference between node and junction.
4. Formulate the relationship between current and voltage in pure resistor /inductor/capacitor
5. What do you understand from linear and non-linear circuit.
6. Enlist the different type of voltage sources and current sources.
7. Can a voltage sources be equivalent to current sources?
8. State and prove Thevenin's theorem / Norton Theorem / Superposition theorem.
9. Derive the necessary equations for converting a delta/star network into an equivalent star/delta network.
10. What are transient? How they occur? Discuss the step voltage transient response of RL or RC series circuit.

Chapter 2: AC Circuits

1. Define peak value, RMS value and average value of an AC quantity.
2. Name two ways of connecting a 3-phase system. Draw their phasor diagrams and write down the relationship between phase and line voltage and current for these systems?
3. An alternating current is represented as $i = 40 \sin(314t - \pi/6)$ A. For this alternating current, determine (a) maximum value (b) RMS value (c) frequency (d) instantaneous value at $t = 0.0034$ sec.
4. An alternating voltage is given by $V = 141.4 \sin 314t$. Find (i) Frequency (ii) RMS value of voltage (iii) average value of voltage (iv) instantaneous value of voltage when t is 3msec.
5. A coil of resistance 12 ohm and inductive reactance 25 ohm is connected in series with a capacitive reactance of 41 ohm. The combination is connected to supply of 230 V, 50Hz .Find a. Circuit Impedance b. current c. power factor d. power consumed
6. Draw power triangle and discuss various types of power in ac circuits.
7. Deduce an expression for current, impedance and power factor for RL / RC/ RLC series circuit when ac voltage is applied and draw the phase curve.
8. Discuss briefly the conditions of resonance in RL /RC / RLC circuit.
9. The circuit A and B are connected in parallel to a 230 v, 50Hz supply. Circuit A consist of resistance 20 ohms in series with an inductive reactance of 20 ohms and circuit B consist resistance of 40 ohms in series with an capacitive reactance of 20 ohms. Determine (i) current drawn by each circuit (ii) total current drawn from the mains
10. Distinguish between the series and parallel resonance.