

Time: 3 hours

Marks: 80

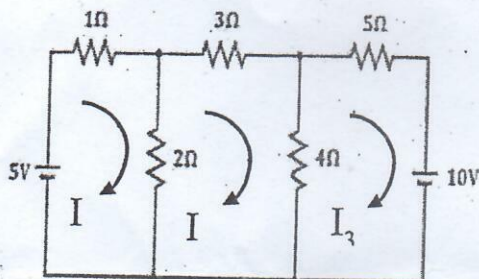
1. Q.1 is compulsory
2. Answer any three out of the remaining questions
3. Assumptions made should be clearly stated

I. Answer any four

- (a) State any four conditions of series resonance and define Quality factor. 05
- (b) Compare star and delta connection of three phase circuits. 05
- (c) State and Prove maximum Power transfer theorem 05
- (d) What is the working principle of a single-phase transformer. 05
- (e) Comment on the classification of induction machines and compare them. 05

II. A) Define instantaneous value, peak value, frequency, time period and RMS value of an alternating quantity. 10

B) Find the mesh currents I_1 , I_2 and I_3 ? 10



III. A) Prove the relation between phase voltage and line voltage in a three-phase star connected system with neat phasor diagrams. 10

B) Two wattmeters connected to measure power in a three-phase system using the two-wattmeter method, indicate 1250W and 250W respectively. Find the total power supplied and the power factor of the circuit when both the readings are positive. 10

IV. A) A coil having a resistance of 5Ω and an inductance of 0.1H is connected in series with a $50\mu\text{F}$ capacitor. An alternating voltage of 200V is applied to the circuit. At what value of frequency will the current be a maximum? Calculate the following for this frequency: (i) impedance of the circuit (ii) current; (iii) reactance of inductor and reactance of capacitor, (v) voltages across coil and voltages across capacitor. 10

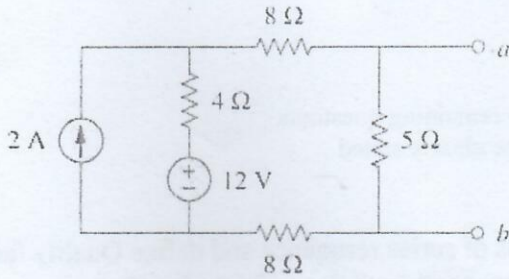
B) Explain the working of a single-phase induction motor? 10

V. A) Explain the steps to find Thevenin's equivalent circuit of a network. 10

B) Derive the expression for RMS value of a pure sinewave. 10

VI. A) Find voltage across 5Ω using source transformation technique.

10



B) What is an ideal transformer? Derive the emf equation of a single-phase transformer.

10
