10-06-2026 FE (SEM-I) (ALL BRANCHES) C SCHEME BEE QP CODE: 20014994

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**

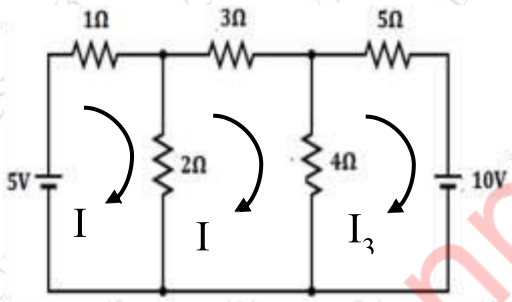
(c) State and Prove maximum Power transfer theorem **05**

(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 50μF 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**

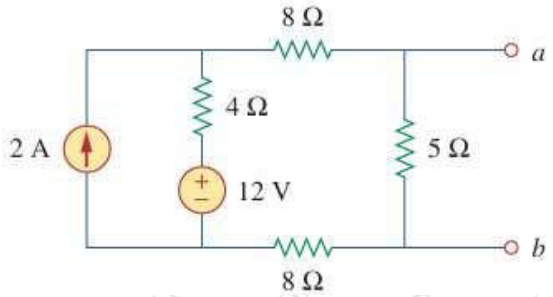
V. A) Explain the steps to find Thevenin's equivalent circuit of a network. **10**

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

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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**

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