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COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2007

EE 04 109—BASIC ELECTRICAL ENGINEERING

(For AI, EE, EC, IC, BM, BT)

Time: Three Hours

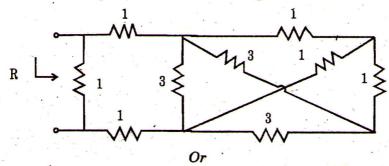
Maximum: 100 Marks

Answer all questions.

- I. (a) It is required to operate a 1 kW, 220 volt electric heater from 250 volt mains. What is the value of the resistance to be used in series? What is the percentage of power wasted in the series resistance?
 - (b) Give Kirchhoff's current and voltage laws.
 - (c) Give the magnetisation curves of ferromagnetic materials.
 - (d) Define terms: Rise time and fall time.
 - (e) Give the phasor representation of sinusoidal qualities.
 - (f) Define the terms: Resonant frequency and Q factor.
 - (g) Write short notes on 4 wire system.
 - (h) Write the concept of Neutral shift.

 $(8 \times 5 = 40 \text{ marks})$

II. (a) Reduce the network of figure 1 (below) into a single resistance.



(b) Explain Maximum power transfer theorem with an example.

(15 marks)

III. (a) (i) Explain the operation of charging and discharging of capacitor.

(8 marks)

(ii) Find the capacitance of parallel plate capacitor.

(7 marks)

Or

(b) A series circuit consisting of a 12 ohm resistor, a 84.4 μf capacitor and a variable inductor is connected to a 100 volt 50 Hz source. (a) For the condition of resonance, determine the inductance current and voltage drop across the inudctor (b) Determine the inductance current and the voltage drop across the inductor when this voltage drop is maximum.

(15 marks)

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IV. (a) Define the te	rms and explain:
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(i) Waveform.

(ii) Cycle.

(iii) Time period.

(iv) Frequency.

(iv) amplitude.

Or

(b) Give the applications of Thevenin's theorem for AC circuits.

(15 marks)

V. (a) Explain Star-delta transformation in detail.

Or

(b) Explain three phase power measurement.

(15 marks)

 $[4 \times 15 = 60 \text{ marks}]$

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