Subject Code: R13212/R13 **Set No - 1**

I B.Tech II Semester Supplementary Examinations Dec./Jan. – 2015/2016

ELECTRICAL CIRCUITS ANALYSIS-I

(EEE)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) State Kirchhoff's laws. What are its limitations?
   (b) Define phase angle and phase difference.
   (c) A series RLC circuit has R=80 ohms, L=100 μH, C=0.3 μF. Find the resonant frequency and current at resonance if the supply voltage is 10 V.
   (d) State Faraday's laws of electromagnetic induction.
   (e) Write the properties of dual networks.
   (f) State compensation theorem.

[4+4+4+4+3+3]

PART-B

2. (a) Explain the star-to-delta and delta-to-star transformation for a resistive network.
   (b) Find a single source equivalent at the terminals of a circuit shown in fig.1

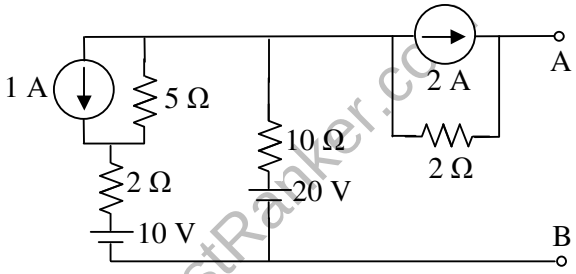

Fig.1

[8+8]

3. (a) Two coils A and B are connected in series across a 240 V, 50 Hz supply. The resistance of coil A is 5 ohms and inductance of coil B is 0.015 H. If input from the supply is 3 kW and 2 kVAr, find the resistance of coil B and inductance of coil A. Also calculate voltage across each coil.
   (b) A resistance R, an inductance L=0.01 H, and a capacitance C are connected in series. When a voltage $v = 400\cos(3000t - 10^0)$ volts is applied to the series combination, a current flowing is $i = 10\sqrt{2}\cos(3000t - 55^0)$ amperes. Find R and C.

[8+8]

4. (a) Show that resonant frequency ω_n of RLC series circuit is geometric mean of lower and upper half-frequencies ω_1 and ω_2.

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4. (b) Find the value of L so that the circuit shown in fig.2 resonates.

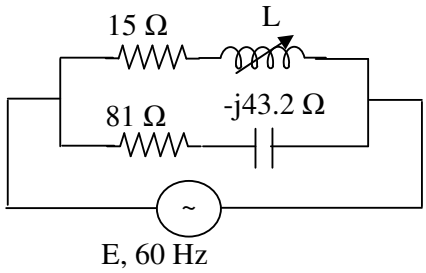

Fig.2

[8+8]

5. (a) Explain the dot convention in coupled circuits.
   (b) A magnetic circuit consists of an iron ring of mean circumference 80 cm with cross-sectional area of 12 cm^2 throughout. A current of 2A in the magnetizing coil of 200 turns produce a total flux of 1.2 m Wb in the iron. Calculate: (i) the flux density in the iron (ii) the absolute and relative permeability of iron (iii) the reluctance of the circuit.

[7+9]

6. (a) Explain the procedure to form the tie-set matrix of the given network. Discuss the advantages of tie-set matrix.
   (b) For the network shown in Fig.3, obtain the fundamental cut-set matrix.

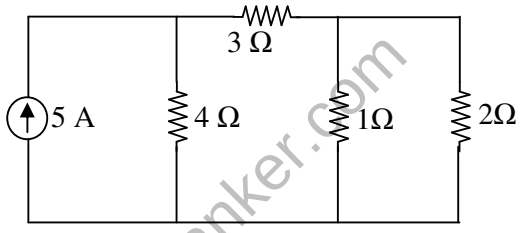

Fig.3

[8+8]

7. (a) State and explain the Maximum power transfer theorem.
   (b) Find V_L in the circuit shown in fig.4, using superposition theorem.

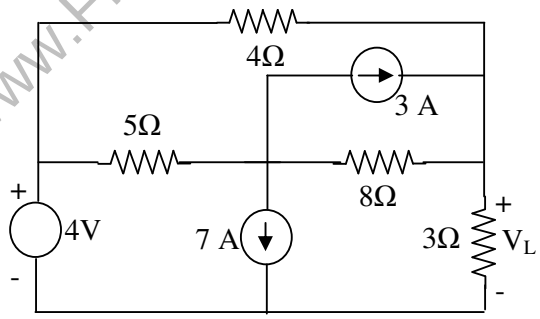

Fig.4

[8+8]

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