Code: 13A02101

SS

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015

ELECTRICAL CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define self inductance and mutual inductance.

(b) Give the expressions for V-I relationship of passive elements.

(c) Define phase and phase difference.

(d) How the phase and line voltages are related in star and delta connected three phase circuits?

(e) What are the properties of resonance in RLC series circuit?

(f) What is the difference between nodal analysis and super node analysis?

(g) Give the conditions of reciprocity and symmetry of ABCD parameters.

(h) State Milliman's theorem.

(i) A D.C voltage of 100 volts is applied to a series RL circuit with R = 25 Ω. What will be the current in the circuit at twice the time constant?

(j) What are the properties of Fourier analysis?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Explain what do you understand by coefficient of coupling and derive the expression for it.

(b) An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the relative permeability of the iron is 400, when a current of 1 amp flows in the winding, determine the flux density. Neglect leakage and fringing.

(OR)

3 (a) Distinguish between electrical and magnetic circuits.

(b) What is the difference between an ideal source and a practical source? Draw the relevant characteristics of the above sources.

UNIT – II

4 Two wattmeters are used to measure the power in a 3-phase balanced system. What is the power factor of the load, when (i) both readings are equal. (ii) both the meters are read equal but one is '-ve'. (iii) one reads twice the other.

(OR)

5 (a) Determine the rms and average values for a half wave rectified sine wave.

(b) Each phase of a balanced star connected load consists of R = 10 ohms and C = 10 μF. Calculate the line current and total real and reactive powers when a symmetrical 400 V, 50 Hz, 3-phase supply is applied to it.

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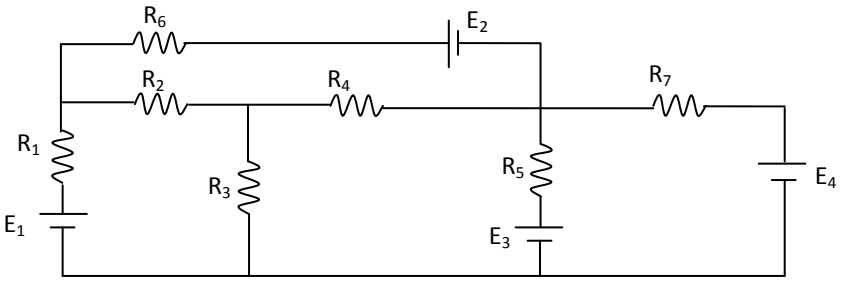
UNIT – III

6 (a) Draw the oriented graph of the network shown in figure below and write the cut set matrix.



(b) Explain the concept of bandwidth and Q factor.

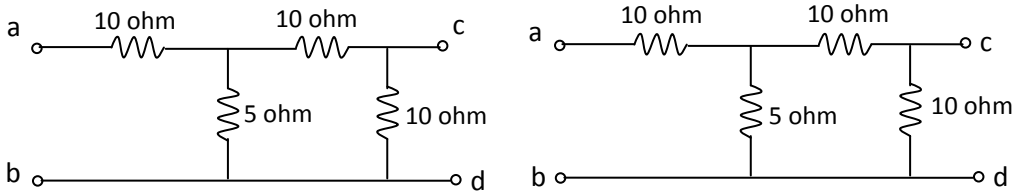
(OR)

7 (a) With neat graph, explain how the parameters in RLC series circuit varies with frequency.

(b) Obtain the relationship between resonant frequency and half power frequencies in a series resonant circuit.

UNIT – IV

8 Two networks have been shown in figure below; obtain the transmission parameters of the resulting circuit when both the circuits are cascade.



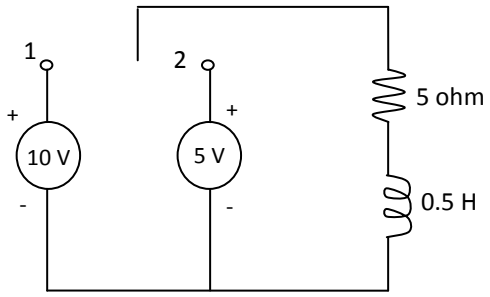
(OR)

9 (a) Discuss about the different types of connections of two port networks.

(b) With a suitable example, state and explain the superposition theorem.

UNIT – V

10 In the figure given below, the switch is close at position 1 at t = 0. At t = 0.5 m sec. The switch is moved to position 2. Find the expression for the current in both the conditions and sketch the transient.



(OR)

11 For RLC series circuit with D.C excitation obtain the expressions for (i) under damped. (ii) over damped. (iii) critically damped conditions. Draw the responses in each case.

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