Code: 9A02305

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

**ELECTRICAL CIRCUITS**

(Common to EEE, EIE, E.Con.E, ECE & ECC)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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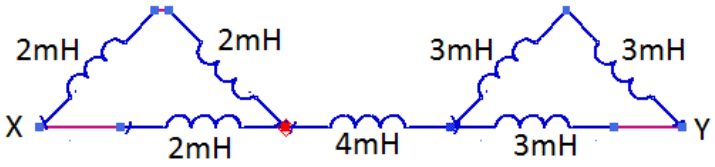
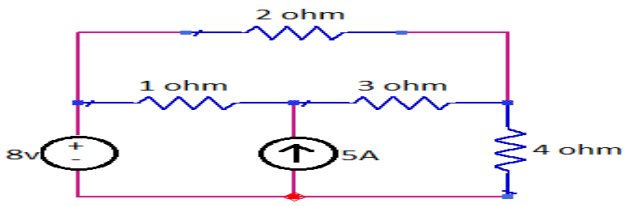
1 (a) State and explain the voltage current relationship for:
(i) Resistance. (ii) Inductance. iii) Capacitance.
(b) Find the equivalent inductance between terminals x-y in the inductive network of figure below.




2 (a) With three node general circuits explain the nodal analysis to find the node voltages.
(b) For the circuit shown find the currents and voltages in all the branches using node voltage method.




3 (a) Define form factor, RMS value, and average value of an alternating quantity.
(b) A reactor of reactance Xp is in parallel with a resistor of resistance Rp. Formulate the equivalence between parallel and series circuits.

4 Show that the locus of the current in an R-L circuit with R variable is a semicircle. Find the radius and the center of the circle.

5 (a) Derive expression for mutual inductance in terms of flux and current.
(b) Two coils connected in series have an equivalent inductance of 0.8 H when connected in aiding, and an equivalent inductance of 0.5 H when the connection is opposing. If one of the coils has self inductance of 0.3 H, find mutual inductance of the coils and also find coefficient of coupling between the coils.

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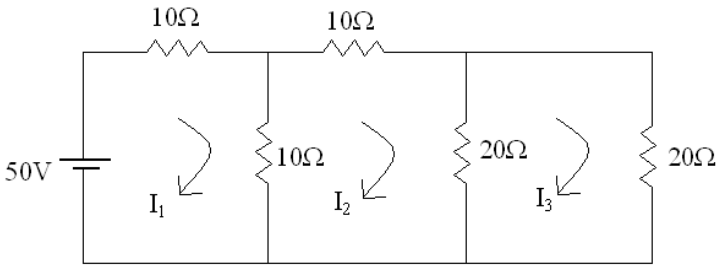
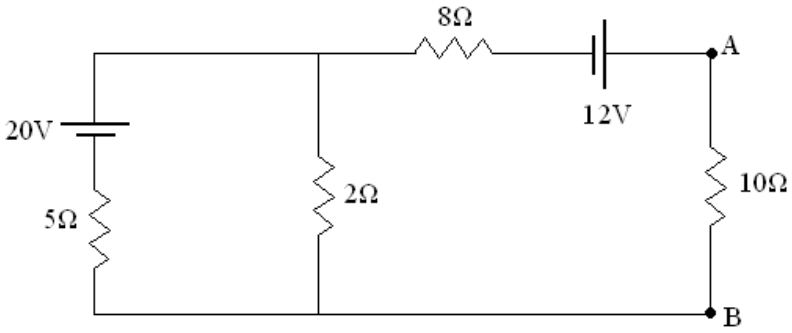
6 Draw the graph of the network shown, select a suitable tree to write tie-set schedule. Then find the loop currents.




7 (a) State and explain maximum power transfer theorem for A.C networks.
(b) In the circuit shown in figure, use Norton's Theorem to find current through 10 Ω Resistor.




8 (a) State and explain Tellegen's theorem.
(b) Write limitations of Super position theorem.
(c) Prove reciprocity theorem.

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