Code No: R21023 **R10** SET - 1

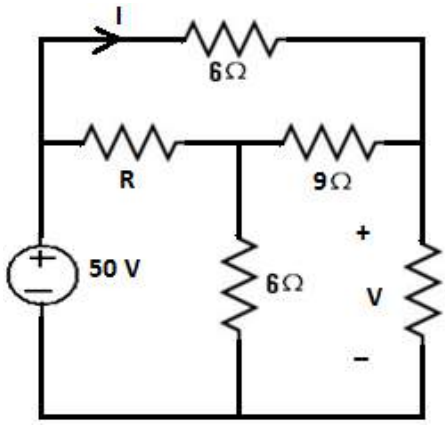
II B. Tech I Semester Supplementary Examinations, Dec - 2015
ELECTRICAL CIRCUIT ANALYSIS - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

1. a) Explain in detail about the source transformation with the help of necessary examples (8M)
   b) A practical voltage source whose short circuit current is 2 A and open circuit voltage is 20 V. What is the voltage across and the value of power dissipated in the load resistance when this source is delivering a current of 0.5A? (7M)

2. a) In the circuit shown below, if V = 20V then determine I and R (8M)



   b) What is a super mesh? Explain in detail about its usage in solving the networks (7M)

3. a) Define RMS value and average value and also derive the expressions of the same for a sinusoidal wave form. (7M)
   b) An inductive coil, having resistance of 10 Ω and inductance of 50 mH, is connected in series with a capacitance of 100 µF across 100V, 50 Hz supply. Calculate the current, the power factor and the voltage drops across the capacitor and the coil respectively. (8M)

4. a) Draw the locus diagram of series RL circuit and explain in detail (7M)
   b) Find the resonant frequency, quality factor and the bandwidth of a parallel RLC circuit with R = 20 kΩ, L = 10 mH and C = 50 pF (8M)

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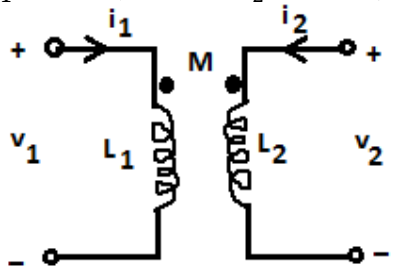
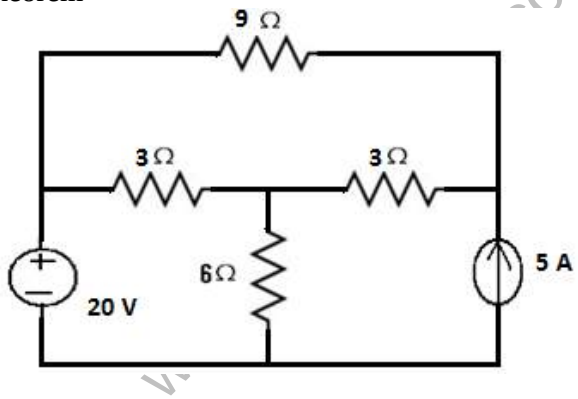
5. a) With necessary examples, define magnetic circuit, MMF, flux and reluctance (7M)
   b) In the circuit shown below, L_1 = L_2 = 5 H and M = 0.5 H. If $v_1 = 4\,e^{-t}$, $v_2 = 3e^{-2t}$, Compute i_1 *and* i_2 (8M)



6. a) With the help of examples, define chord, nullity, incidence matrix and circuit matrix (7M)
   b) Explain in detail about Loop method of analysis of Networks with dependent & independent voltage and current sources (8M)

7. a) State and explain the Millman's theorem for the circuits with sinusoidal excitation (7M)
   b) Determine the current in the 9Ω resistor in the circuit below using Norton's theorem (8M)



8. a) State and explain the Compensation theorem for the circuits with sinusoidal excitation (7M)
   b) Using reciprocity theorem, for the circuit below determine the current in 9 Ω resistor when an extra battery of EMF 10 V is added in the 6Ω branch (8M)