Code No: R13212 **R13** **SET-1**

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2017
ELECTRICAL CIRCUITS ANALYSIS-I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **THREE** Questions from **Part-B**

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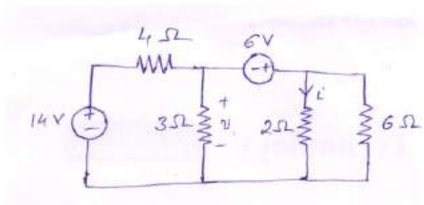
PART –A

1. a) Find v in the circuit of figure. (4M)



b) Find the sinusoid corresponding to the following phasor: (3M)
$V = -25 \angle 40^\circ$ V

c) Obtain resonance frequency in series RLC circuit. (3M)

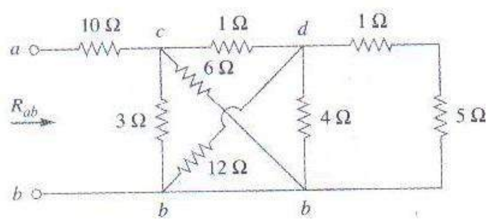
d) Compare electric and magnetic circuits. (4M)

e) Define Graph and Tree. (4M)

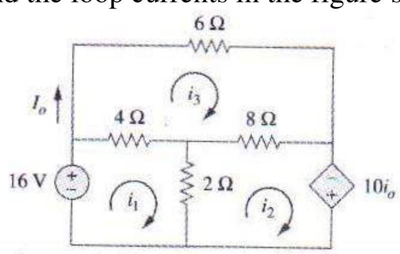
f) State and explain Maximum Power transfer theorem. (4M)

PART –B

2. a) Calculate the equivalent resistance R_{ab} in the circuit shown in below figure. (8M)



b) Using mesh analysis, find the loop currents in the figure shown below. (8M)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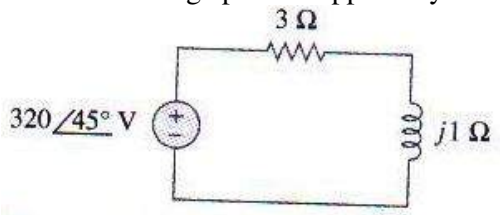
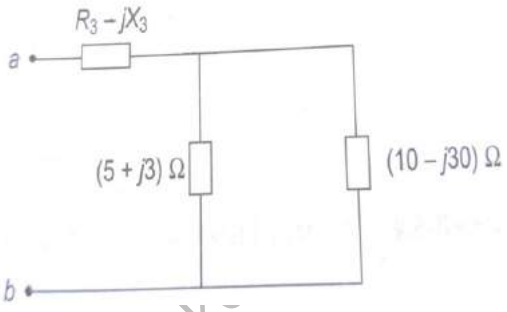
3. a) In the circuit shown in below figure, Calculate the average power absorbed by the resistor and inductor. Find the average power supplied by the voltage source. (6M)



b) Three impedances (2+j4)Ω, (3-j5)Ω and (1-j3)Ω are connected in parallel. The combination is in series with a coil of resistance 3 Ω and inductance 0.02H to 230V, 50Hz supply. Find (10M)
(i) The complex expression for the total impedance of the circuit.
(ii) Current taken from the supply.

4. a) The impedance $Z_1 = (5 + j3)\ \Omega$ and $Z_2 = (10 - j30)\ \Omega$ are connected in parallel as shown in below figure. Find the value of X_3 which will produce resonance at the terminals a and b (8M)

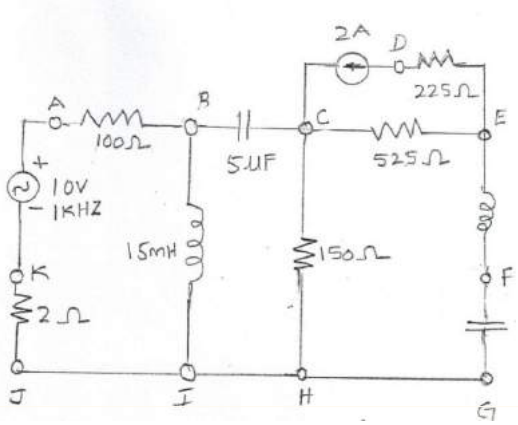


b) Draw and explain the Locus diagram of RL circuit with variable Resistance. (8M)

5. a) 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. Calculate the mutual inductance of the coils and coupling coefficient. (8M)

b) Explain Self and Mutual Inductance in coupled magnetic circuits. (8M)

6. a) For the Electrical network shown in below figure, draw its topological graph and write its incidence matrix (9M)



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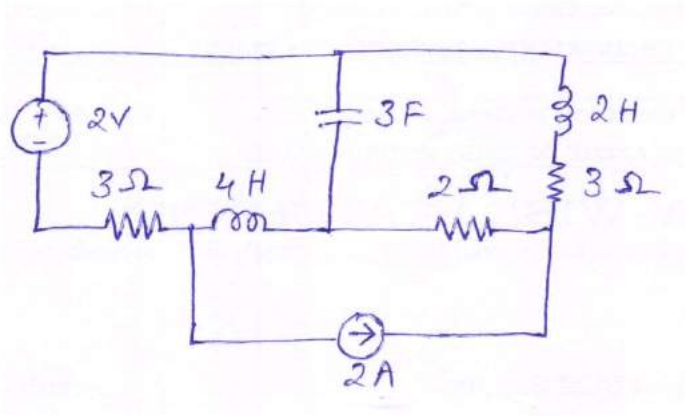
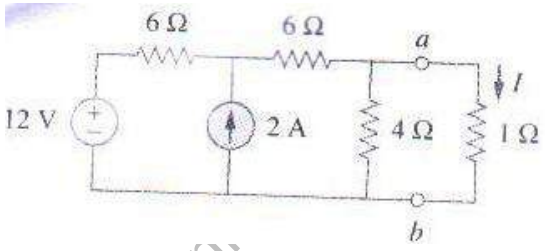
b) Construct the dual of the network shown in below figure. (7M)



7. a) Using Thevenin's theorem, find the equivalent circuit to the left of the terminals in the circuit of Fig., Then find *I*. (8M)



b) Find i_o in the circuit shown in Figure using superposition. (8M)