Code No: R13211 **R13** **SET-1**

I B. Tech II Semester Supplementary Examinations, April/May - 2018
NETWORK ANALYSIS
(Com. to ECE, EIE, E Com E)

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) Discuss about Ideal and Non-Ideal sources. (4M)

   b) The impedance of each branch of a delta-connected circuit is $\sqrt{3}Z$. What will be the branch impedance of equivalent star-connected circuit? (3M)

   c) A coil of 20 ohm resistance and an inductance of 0.2 H is connected in parallel with a capacitor of 100 μF. Determine the resonant frequency. (4M)

   d) State Maximum Power transfer theorem. (3M)

   e) Determine the Z-parameters of the network shown in figure 1(e). (4M)

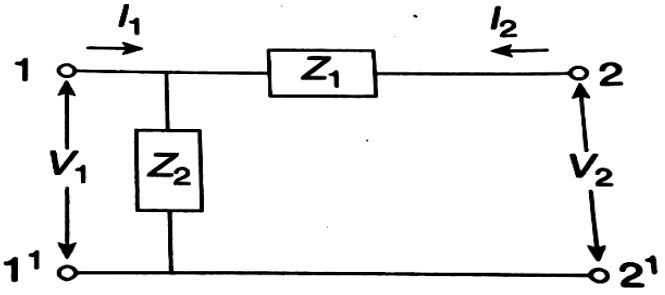

Figure 1(e)

   f) The values of R and L in a series R-L circuit are 10 Ω and 40 H, respectively. At the instant of closing the switch, the current rises at the rate of 5A/s. Calculate the value of applied voltage. (4M)

PART –B

2. a) Draw the oriented graph of network shown figure 2(a). Write the incidence matrix. (7M)

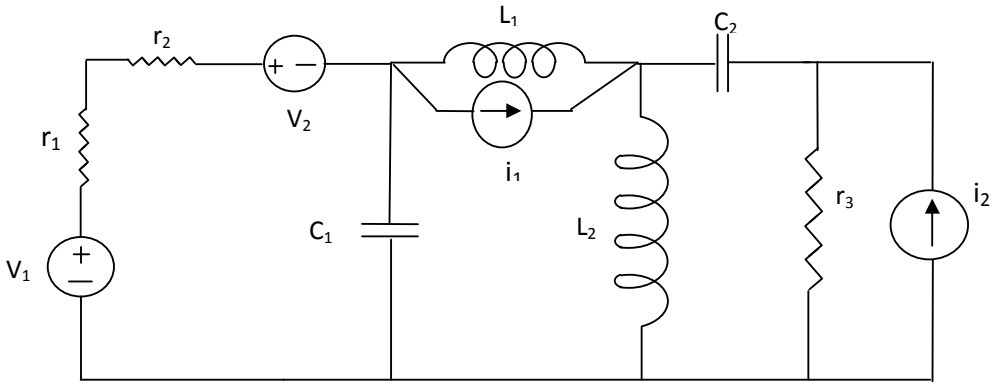

Figure 2(a)
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b) Find the node voltages V_1,V_2 and V_3 in figure 2(b). (9M)

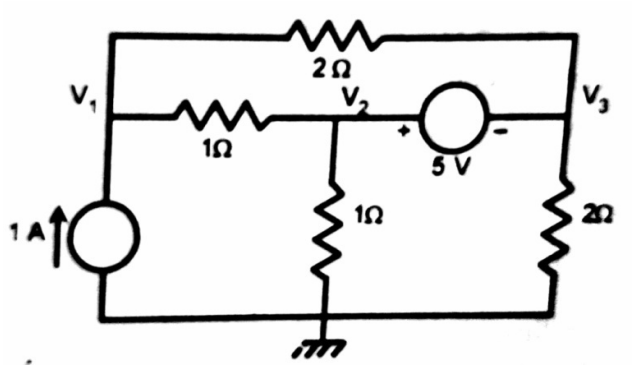

Figure 2(b)

3. a) In the circuit shown in figure 3(a) find total current i_T and power factor. Take frequency of supply as 100 Hz. (7M)

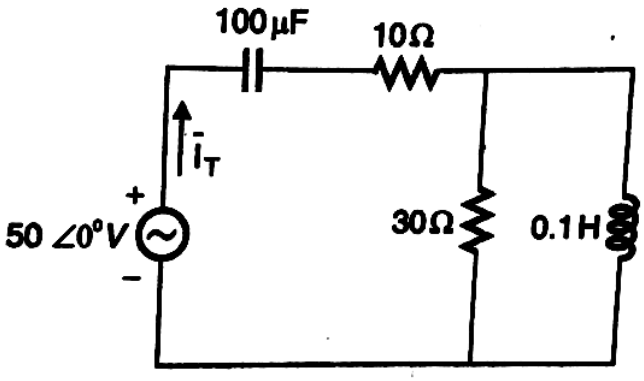

Figure 3(a)

b) An RLC series circuit consists of R = 75 Ω, L = 125 mH and C = 200 µF. The circuit is excited by a sinusoidal source of value 115 V, 60 Hz. Determine the voltage across the various elements. Calculate the current and power. Draw the phasor diagram. (9M)

4. a) Explain the dot convention used in magnetically coupled circuits with the help of suitable examples. (7M)

b) A series RLC circuit has an impedance of 40 Ω at a frequency of 200 rad/s. When the circuit is made to resonate by connecting a 10 V source of variable frequency the current at resonance is 0.5 A, and the quality factor at resonance is 10. Determine the circuit parameters. (9M)

5. a) Calculate the current in the 2Ω resistor shown in figure 5(a), using Thevenin's theorem. (8M)

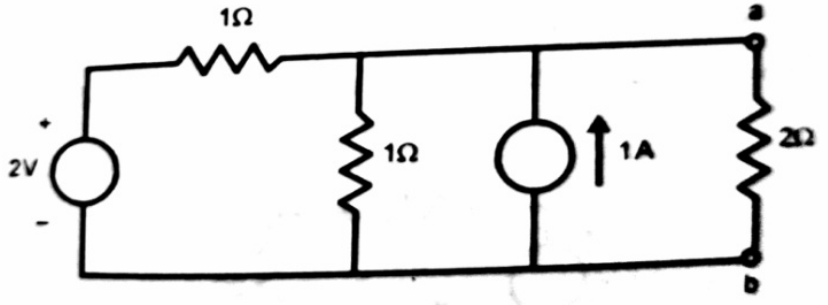

Figure 5(a)

b) Calculate the current I in the 4Ω resistance shown in figure 5(b), using millman's theorem. (8M)

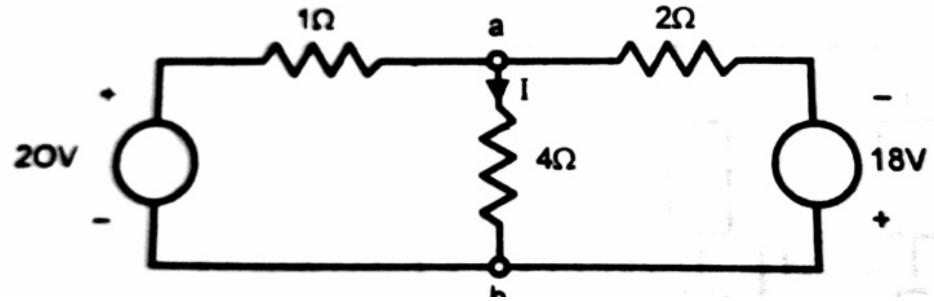

Figure 5(b)

6. a) Determine the Y-parameters for the network shown in figure 6(a). (8M)

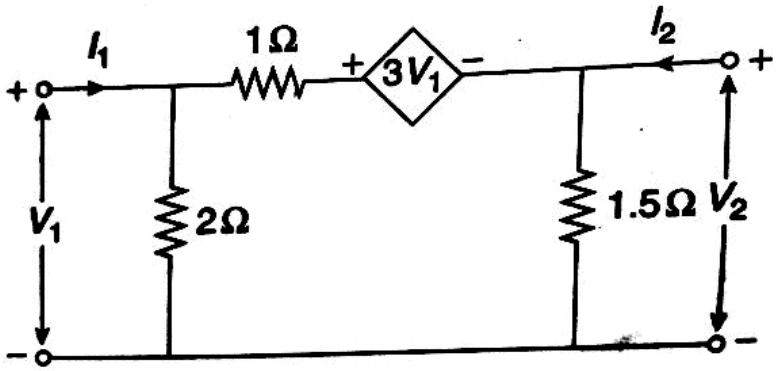

Figure 6(a)

b) Find transmission parameters of the network shown in figure 6(b), and further prove that AD-BC =1 (8M)

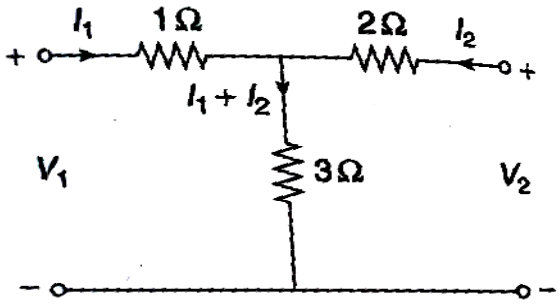

Figure 6(b)

7. a) In the circuit shown in figure 7(a), switch is closed at t = 0. Find the current in the circuit at any time *t* using Laplace transform. (7M)

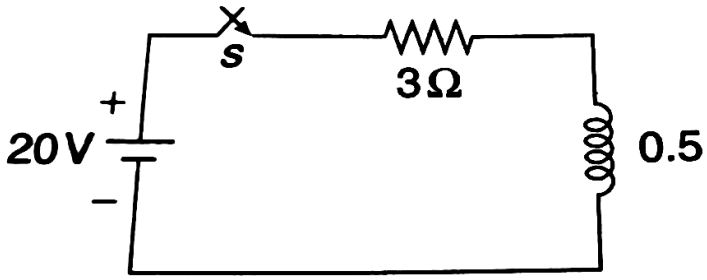

Figure 7(a)

b) For the given circuit find the complete solution for current i(t). Assume zero charge across the capacitor before switching. (9M)

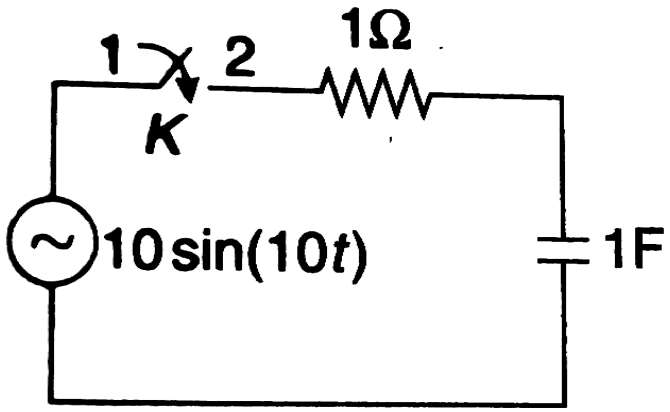

Figure 7(b)