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B. E. (Third Semester) Examination, April-May 2020

(New Scheme)

(EI Engg. Branch)

NETWORK ANALYSIS and SYNTHESIS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each question is compulsory & attempt any* ***two*** *parts from (b), (c) & (d) of each questions.*

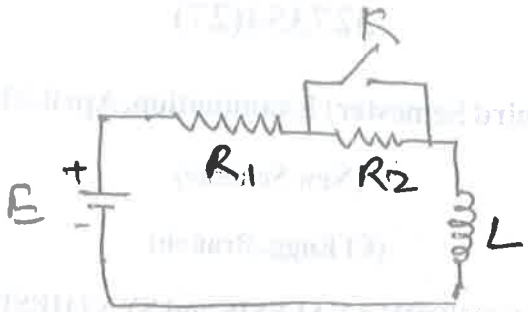
Unit-I

1. (a) Find the Laplace transform of step and unit impulse signal. 2

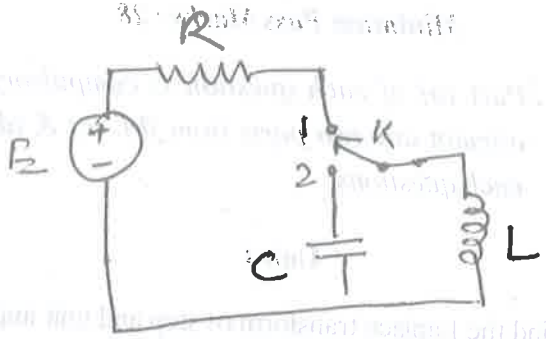
(b) Find the step response of RC series circuit. 7

(c) In the figure, the battery voltage is applied for a steady state period. Obtain the compute expression

for current after closing the switch K. Assuming $R_1 = 1\ \Omega$, $R_2 = 2\Omega$, $L = 1$ H and $E = 10$ V. 7



(d) In the circuit shown steady state exists when switch K is in position 1. At $t = 0$, it is moved to position 2. Obtain the expression for current. 7

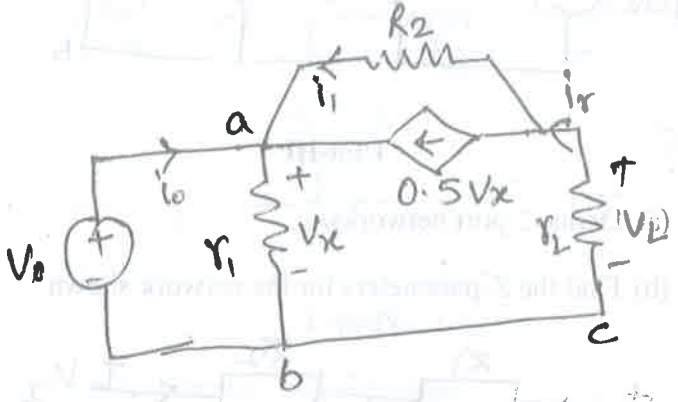


Unit-II

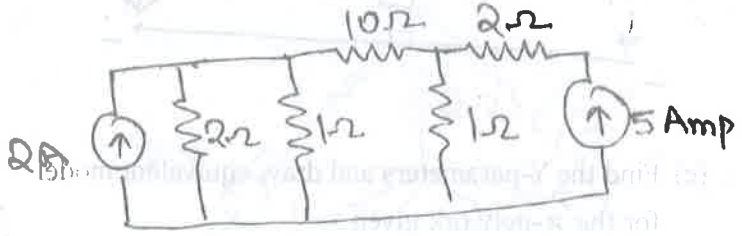
2. (a) Define the condition for maximum power transfer in a circuit. 2

Find V_L

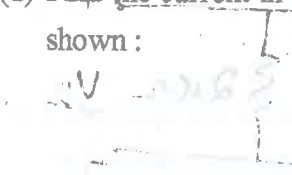
(b) Find V_L using Kirchoff's law, assuming $R_L = 10\ \Omega$, $V_0 = 10$ V, $R_1 = R_2 = 1\ \Omega$. 7

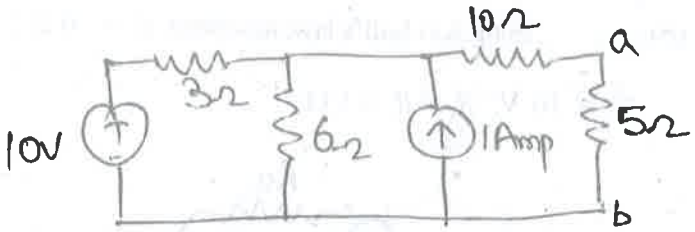


(c) What is the power loss in the 10-Ω resistor? Use Thevenin theorem. 7



(d) Find the current in the 5 Ω reistor for the circuit shown : 7

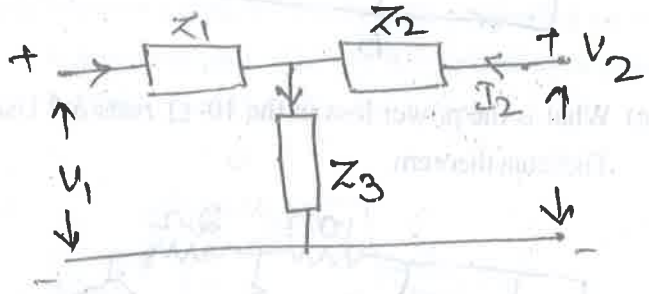




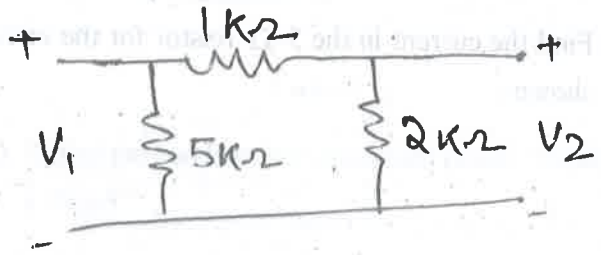
Unit-III

3. (a) Define 2 port networks. 2

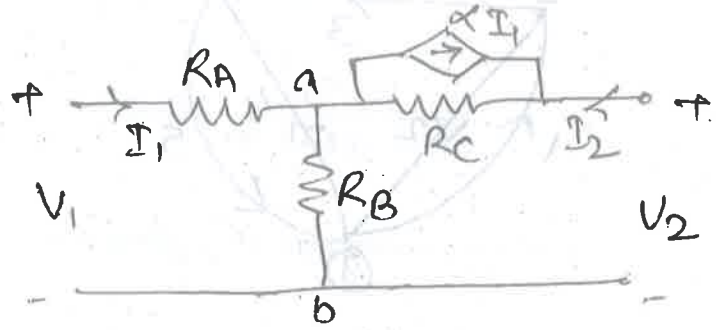
(b) Find the Z-parameters for the network shown. 7



(c) Find the Y-parameters and draw equivalent model for the π-network given : 7



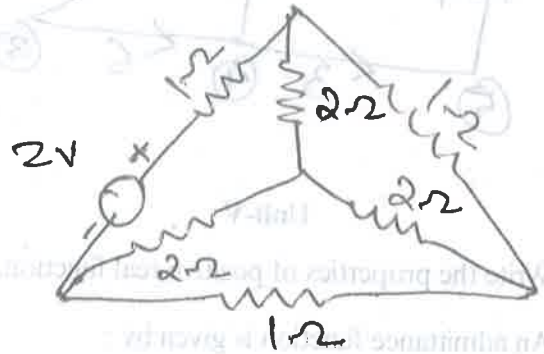
(d) Find the h-parameters. 7



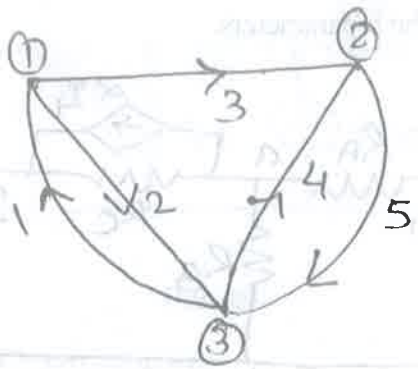
Unit-IV

4. (a) Define branches, link and twigs. 2

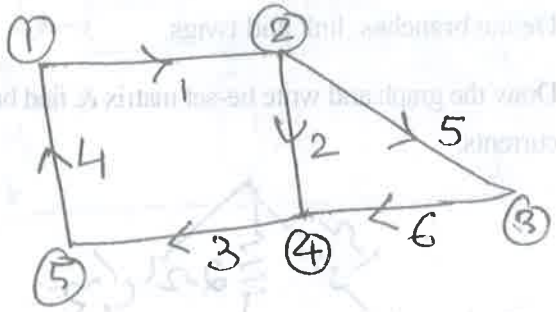
(b) Draw the graph and write tie-set matrix & find branch currents. 7



(c) Develope the fundamental cut-set and equilibrium equations on nodal basis. 7



(d) Show the cut-set for the graph and develope the fundamental cut-set matrix. 7



Unit-V

5. (a) Write the properties of positive real function. 2

(b) An admittance function is given by :

$$Y(s)=\frac{(4s^2+6s)}{(s+1)}$$. Realise the network. 7

(c) Find the second foster form of the admittance function :

$$Y(s)=\frac{s(s^2+9)}{10(s^2+4)(s^2+25)}$$ 7

(d) A driving point impedance is given by :

$$Z_{LC}(s)=\frac{s(s^2+4)(s^2+6)}{(s^2+1)(s^2+5)}$$

Obtain the first form of Cauer network. 7