1T01023 - S.E.(ELECTRONICS & TELE-COMMN)(Sem III) (Choice Based) / 51204 - CIRCUIT THEORY AND

[Time: 3 Hours]

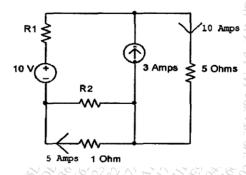
[Marks:80]

Please check whether you have got the right question paper.

N.B:

- Question one is compulsory.
- Answer any three questions from the remaining five.
- Assume suitable data if required.
- 1. Answer all the questions
 - a) Find R_1 and R_2 in the following circuit.

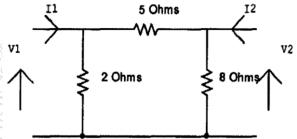
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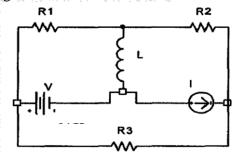
b) Find h parameters for the following 2-port network.

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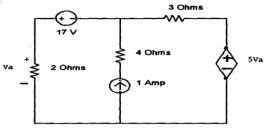


- c) The poles of a driving point impedance function are at 0, -5, and zero at -2, find the function if Z(-3) = 1/6 and synthesize the same in cauer-I form.
- d) Draw the graph of the following network and obtain incidence matrix. 05



a) For the circuit shown below, find the current through 3 ohms resistor, using superposition theorem.

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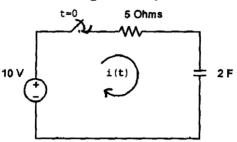


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b) In the following series RC circuit the switch is closed at t=0, find the expression for the current through the capacitor and sketch i(t) versus t.



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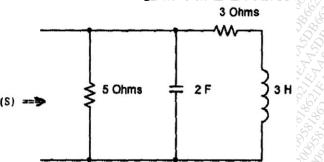
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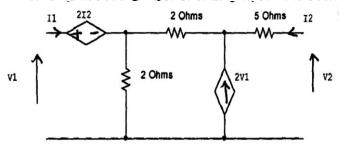
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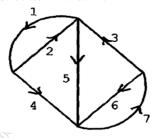
c) Find the driving point impedance for the following network.



3. a) Find the ABCD parameters for the following 2-port network



- b) Check whether the following functions are Hurwitz
 - i) $F(S) = S^5 + 4S^3 + 2S$
 - ii) $F(S) = S^5 + 2S^4 + 5S^3 + 10S^2 + 4S + 8$
- c) The graph of a network is given below. Obtain the tieset matrix.



4. a) Synthesize the following driving point impedance function in Cauer-I and Foster-I forms.

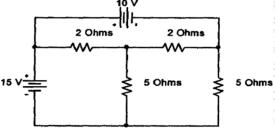
 $Z(s) = (S^2 + 2) (S^2 + 6)/3S (S^2 + 5)$

- b) Obtain h parameters in terms of z parameters.
- c) State and prove initial value theorem. 05

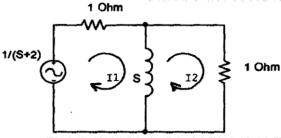
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5. a) For the following network obtain the KVL equilibrium equation in matrix form using the concept of graph theory and hence find the link currents.

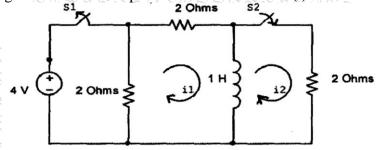


b) Find I₂(S) for the following transformed circuit and hence find i₂ (t) using Inverse Laplace 05 Transform.

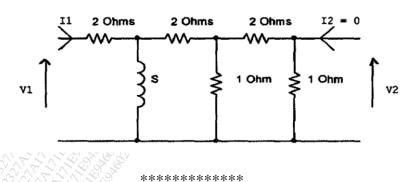


c) Test whether the following function is a Positive Real function. $F(s) = (S^4 + 14S^2 + 45) / (S^3 + 7S)$

6. a) In the circuit given below, the switch S_1 is opened and the switch S_2 is closed at t=0. The switch S_1 10 was closed for a long time before it is opened. Find the current $i_2(t)$



b) For the following ladder network find V_2/V_1 , I_1/V_1 and V_2/I_1



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