1T01033 - S.E.(Electronics and Telecommunication)(SEM-III)(Choice Base Credit Grading System) (R-2020-21) (C Scheme) / 51224 - Network Theory

QP CODE:10011986   DATE: 29/11/2022

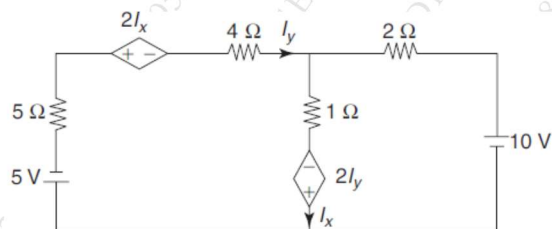[3 Hours]   [Total Marks: 80]

Please Check whether you have got right question paper

N.B.:   1. Question one is Compulsory.
        2. Answer any three questions from the remaining five.
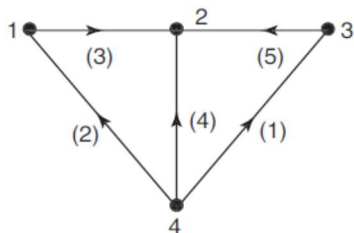   3. Assume suitable data if required.

Q1   **All Questions are Compulsory**   **5 marks each**
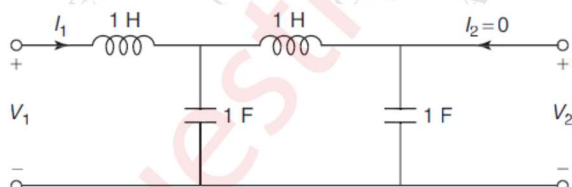
a   Find the Currents I_x and I_y of the Network shown in Figure-

b   For the graph given, Obtain the Incidence Matrix and Find the number of possible trees.

c   Find the Network function $\dfrac{V_1}{I_1}, \dfrac{V_2}{V_1}\ and\ \dfrac{V_2}{I_1}$ for the network shown-

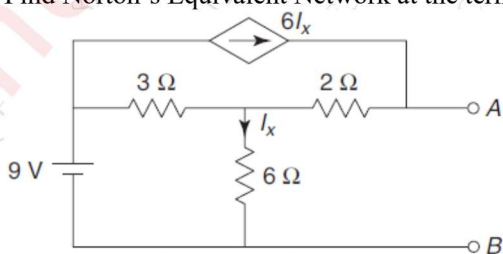d   Check whether $P(s) = S^4 + 5S^3 + 5S^2 + 4S + 10$ is Hurwitz.

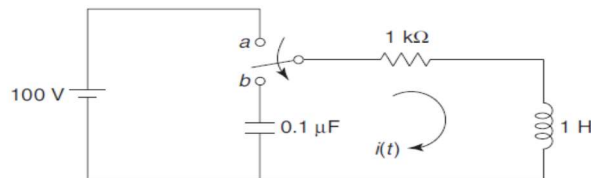**Q2**   **(20 Marks)**

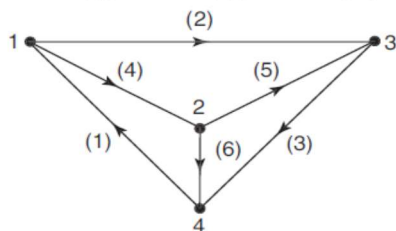a   Find Norton's Equivalent Network at the terminal A and B of Figure shown-   **10M**

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b   In the Network Shown, the switch is changed from position 'a' to ' b ' at t = 0.   **10M**

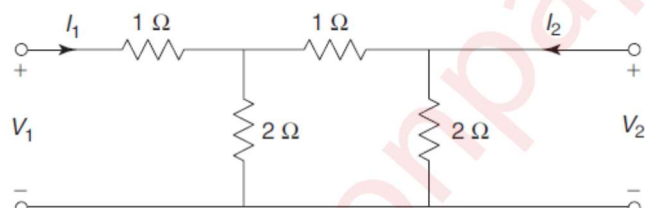Find $i, \dfrac{di}{dt}$ and $\dfrac{d^2t}{dt^2}$ at t = 0^+

Q3   (20 Marks)

a   The Graph of a Network is shown in Figure. Find Tieset Matrix and *f*- cutset   **5M**
Matrix

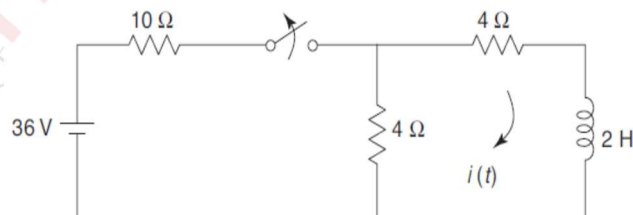b   Find the ABCD parameters of the Network shown in Figure-   **5M**

c   Realise the Foster form- I and Foster form- II of RC Impedance   **10M**
Function.

$$Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$$

Q4   (20 Marks)
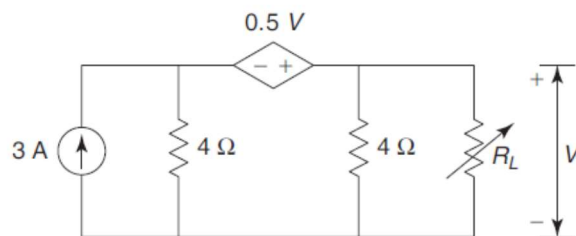
a   *Test whether* $F(s) = \dfrac{2s^3 + 2s^2 + 3s + 2}{s^2 + 1}$ *is positive real function.*

                                                             5M

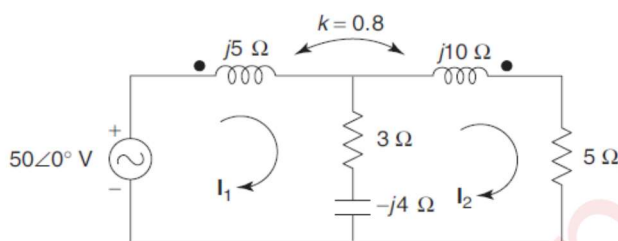b   The Network Shown in figure has acquired steady state for switch closed at t < 0.   **5M**
At t = 0 , the switch is opened. Obtain i(t) for t > 0.

c   What will be the value of R_L in the figure to get maximum power   **10M**
Delivered to it? What is the value of this power?

Q5   (20 Marks)
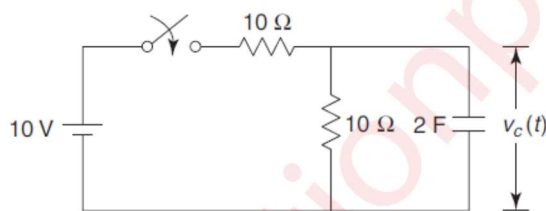
a   Find the Voltage across 5Ω resistor using Mesh Analysis-   **10M**
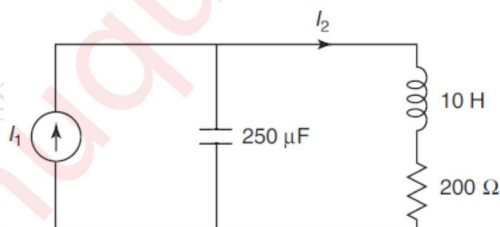

b   The switch in the Network shown is closed at t = 0. Determine the Voltage   **10M**
across the capacitor V_C (t) for t > 0 using Laplace Transform.

Q6   (20 Marks)

a

Draw Pole-Zero diagram of $\dfrac{I_2}{I_1}$ for the Network Shown in Figure   **5M**

b   Find the Condition of Symmetry and Reciprocity of Two port Network   **5M**
Using Z-parameter

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c   A network and its pole zero diagram shown in figure. Determine the   **10M**
Values of R , L and C if $Z(j0) = 1$

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