

[3 Hours]

[Total Marks: 80]

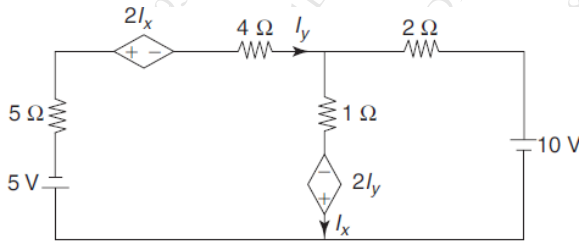
Please Check whether you have got right question paper

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

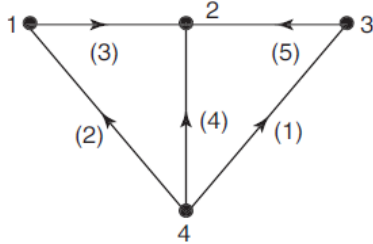
Q1 All Questions are Compulsory

5 marks each

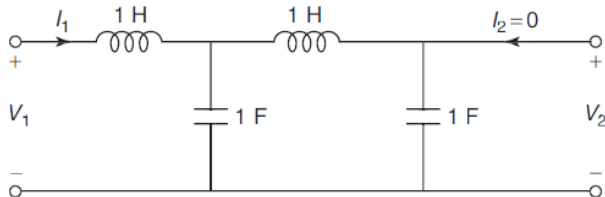
a Find the Currents I_x and I_y of the Network shown in Figure-



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



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



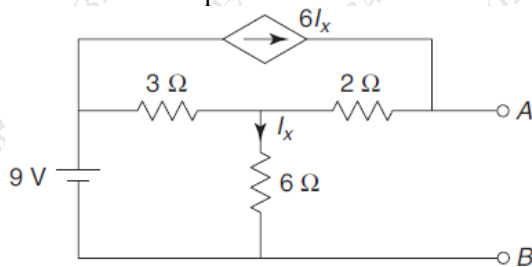
d Check whether $P(s) = S^4 + 5S^3 + 5S^2 + 4S + 10$ is Hurwitz.

Q2

(20 Marks)

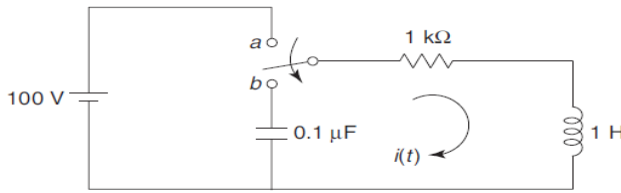
a Find Norton's Equivalent Network at the terminal A and B of Figure shown-

10M



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

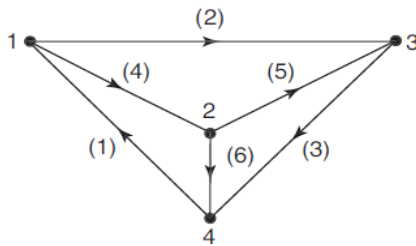
Find i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$



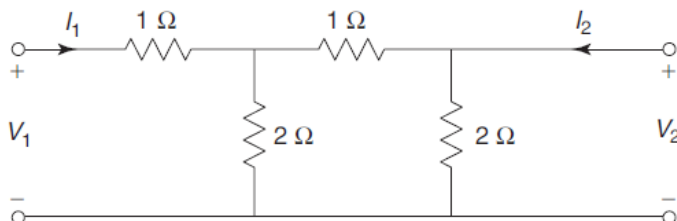
Q3

(20 Marks)

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



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 Function. **10M**

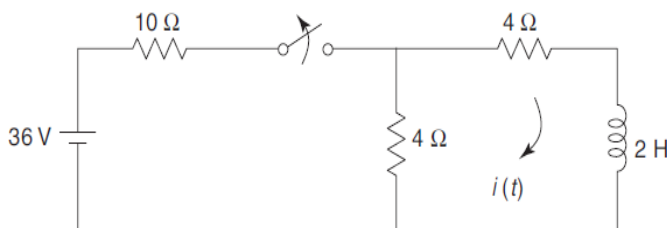
$$Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$$

Q4

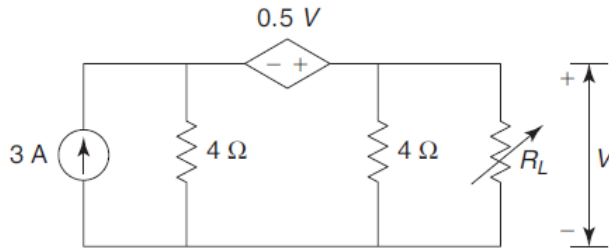
(20 Marks)

a Test whether $F(s) = \frac{2s^3 + 2s^2 + 3s + 2}{s^2 + 1}$ is positive real function. **5M**

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

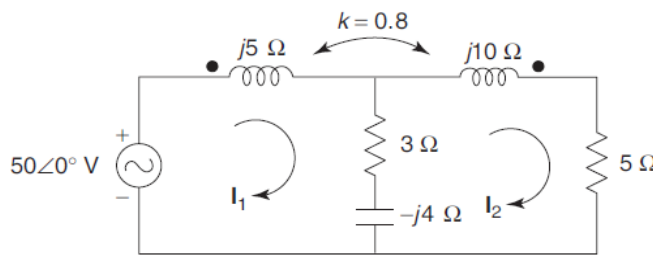


- c What will be the value of R_L in the figure to get maximum power Delivered to it? What is the value of this power? **10M**

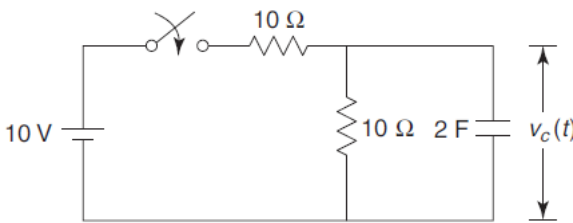


Q5 **(20 Marks)**

- a Find the Voltage across 5Ω resistor using Mesh Analysis- **10M**

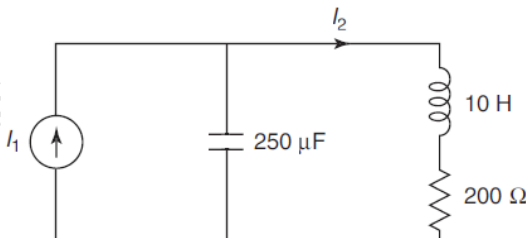


- b The switch in the Network shown is closed at $t = 0$. Determine the Voltage across the capacitor $V_C(t)$ for $t > 0$ using Laplace Transform. **10M**



Q6 **(20 Marks)**

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



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

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

