

(3 Hours)

[Total marks: 80]

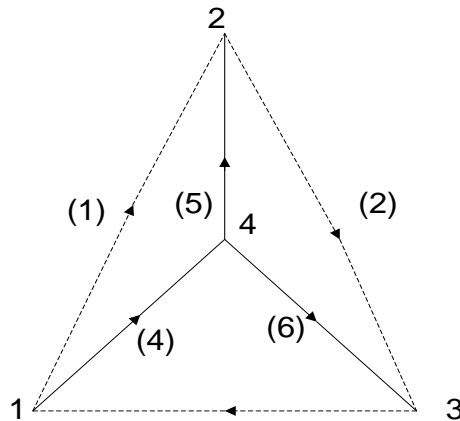
N.B:- (1) **Question 1 is compulsory**

- (2) Solve any **three** questions from remaining **five** questions.
- (3) Figures to the right indicate **full** marks.
- (4) Assume suitable data if necessary.

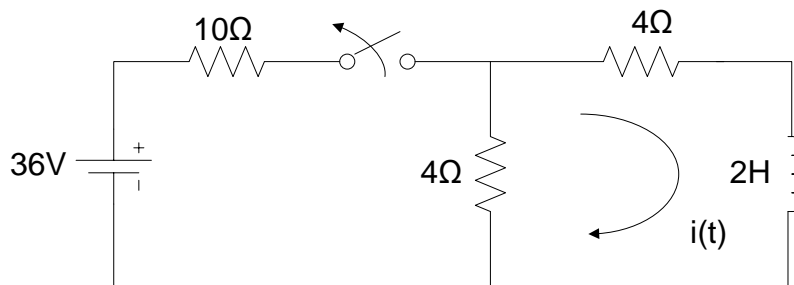
Q1 Attempt the following 20

- a) Write short note on duality of network
- b) Find the condition of reciprocity for Z parameters.
- c) Write properties of positive real function
- d) Test whether the polynomial $s^5 + 3s^3 + 2s$ is Hurwitz.

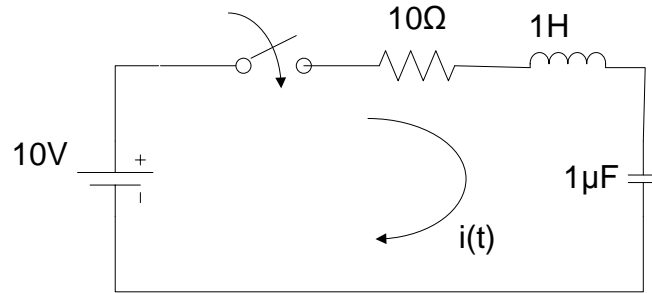
Q2 a) Linear graph of a network is given below. Write f-cutset, f-tieset and incidence matrix. 10



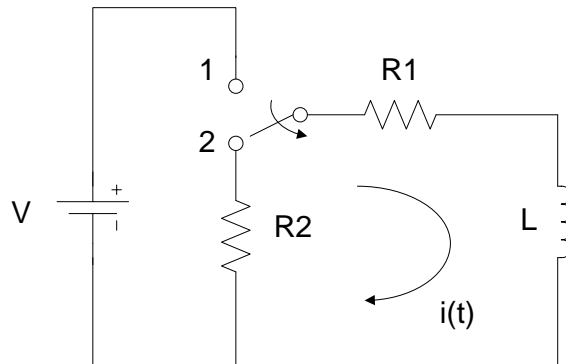
Q2 b) The network shown has acquired steady state with the switch closed for $t < 0$. At $t = 0$, the switch is opened. Obtain $i(t)$ for $t > 0$. 10



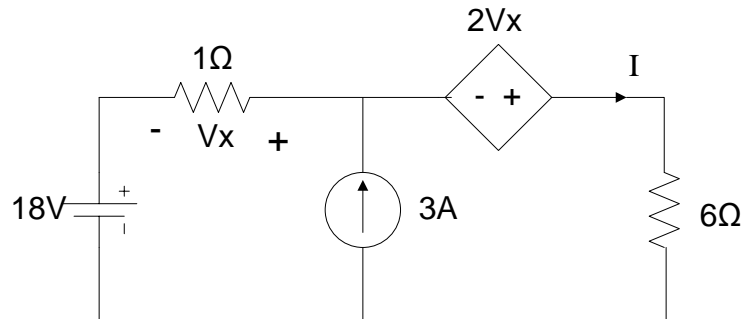
- Q3 a) In the network shown, the switch is closed. Assuming all initial conditions as zero, find i , $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t=0^+$. 10



- Q3 b) In the network shown, the switch is initially at position 1. On the steady state having reached, the switch is changed to the position 2. Find current $i(t)$. 10



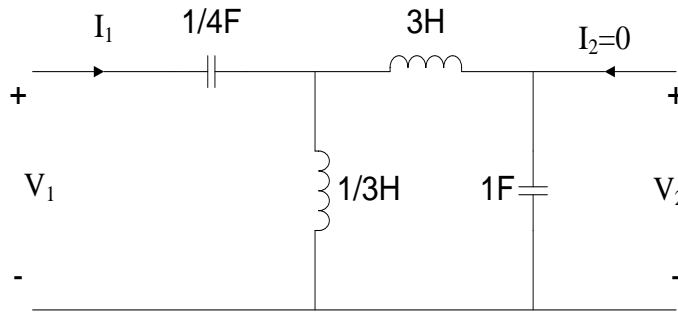
- Q4 a) Find the current in the 6Ω resistor using nodal voltage 10



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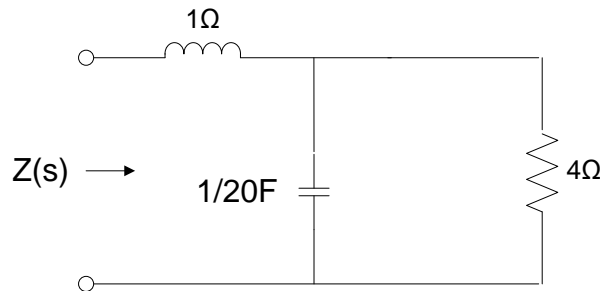
Q4 b) Find Z_{11} and G_{12} for the following circuit.

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Q5 a) Determine $Z(s)$ in the network shown. Find out poles and zeros of $Z(s)$ and plot them on s-plane

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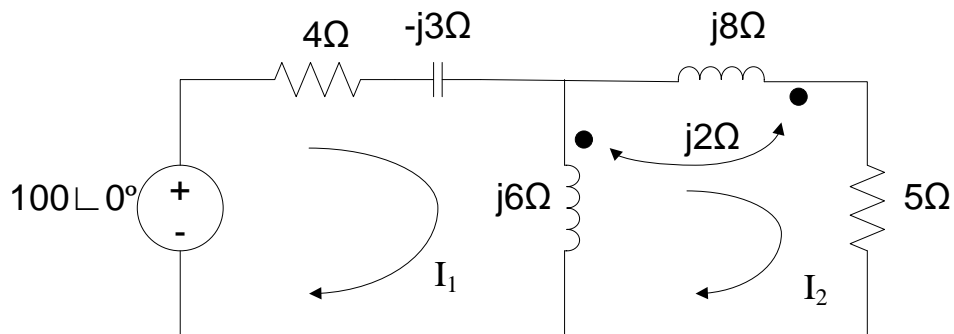
Q5 b) Realize Cauer 1 and Cauer II form for following function

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$$Z(s) = \frac{4(s^2 + 1)(s^2 + 9)}{s(s^2 + 4)}$$

Q6 a) Calculate the mesh currents in the circuit shown

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Q6 b) For the network shown , find Y and Z parameters

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