

Time: 3 Hrs

Marks: 80

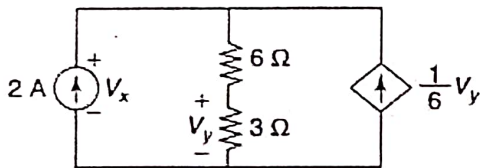
Note:

- Question No. 1 is compulsory.
- Answer any three from the remaining five questions.
- Assume suitable data if necessary and justify the same.

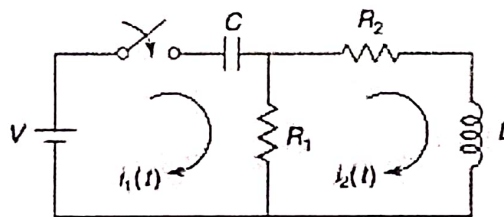
Q1 Each question carries five marks

20M

- a The voltage  $V(s)$  of a network is given by  $V(s) = \frac{(s+8)(s+10)}{(s+4)(s^2+2s+2)}$  Plot its pole-zero diagram
- b Find the voltage ' $V_x$ ' in the following circuit



- c The Z-parameters of a two-port network are:  $Z_{11} = 12 \Omega$ ,  $Z_{12} = Z_{21} = 8 \Omega$ ,  $Z_{22} = 20 \Omega$ . Find the equivalent T-network.
- d In the network shown, the switch is closed at  $t = 0$ , assuming all initial conditions as zero, determine the current  $i_1(0^+)$  and  $i_2(0^+)$ .



Q2 a The reduced incidence matrix of an oriented graph is

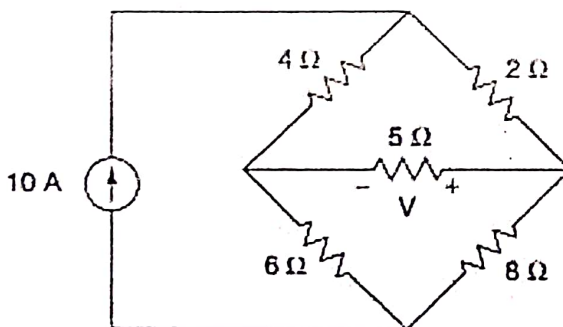
10M

$$A = \begin{bmatrix} 1 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 1 & 0 \end{bmatrix}$$

(a) Draw the graph. (b) How many trees are possible for this graph? (c) Write the tieset and cutset matrices.

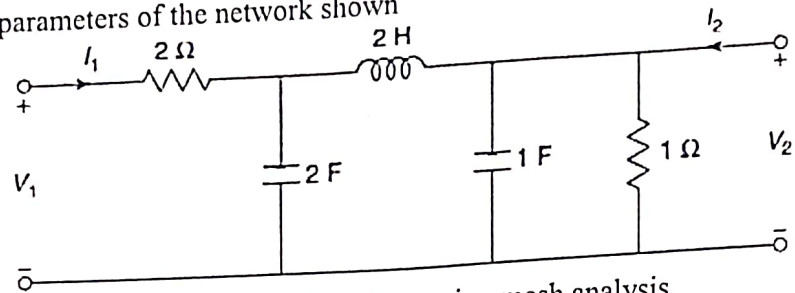
b Find the voltage  $V$  and verify reciprocity theorem for the network shown.

10M



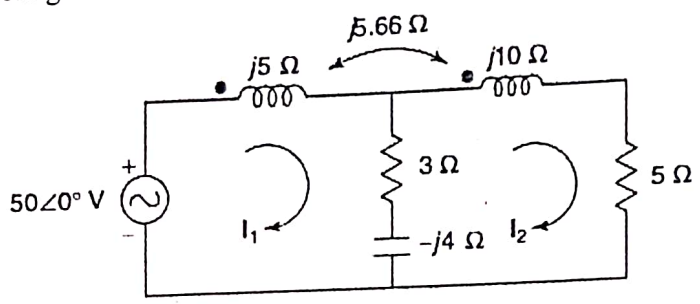
10M

Q3 a Obtain h-parameters of the network shown



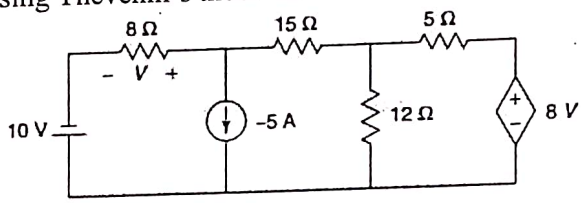
10M

b Determine the voltage across the 3Ω resistor using mesh analysis.



10M

Q4 a Find the voltage V using Thevenin's theorem.

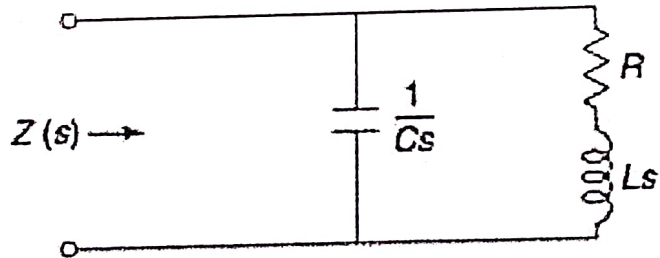


10M

b Derive the condition for reciprocity and symmetry for Y-parameters.

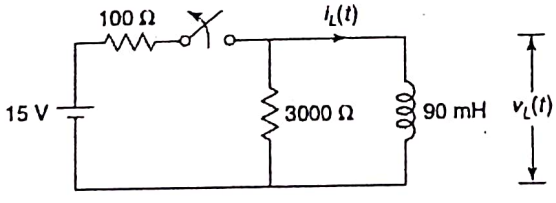
Q5 a For the given network, poles and zeros of driving point function Z(s) are, poles:  $(-1 \pm j2)$ ; zero:  $-4$ . If  $Z(j0) = 1$ , find the values of R, L and C.

10M

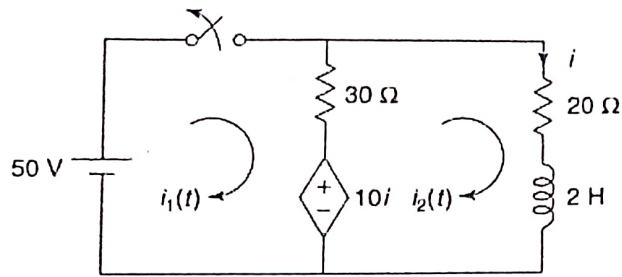


b For the following network, steady state is reached with the switch closed. The switch is opened at  $t = 0$ . Obtain expressions for  $i_L(t)$  and  $v_L(t)$ .

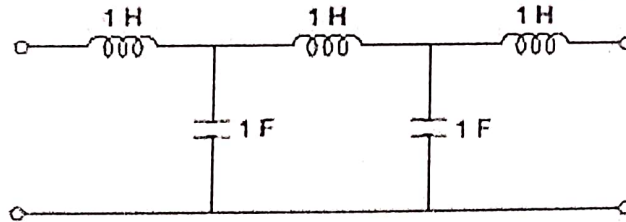
10M



- Q6 a For the network shown, find the current in the  $20\ \Omega$  resistor when the switch is opened at  $t=0$ . 10M



- b Determine the transmission parameters of the following network. 10M



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