

- 1. Question No. 1 is compulsory
- 2. Attempt any four out of the remaining six questions.
- 3. Assume suitable data if required.
- 4. Figures to the right indicate full marks.

Attempt the following questions

- 1. Draw the graph from given incidence matrix and calculate total number of possible trees.

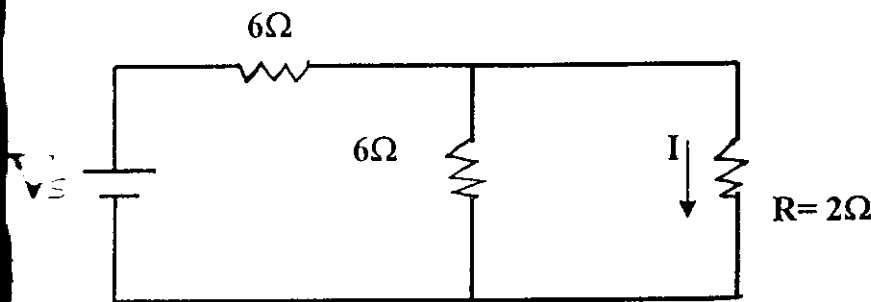
$$A = \begin{vmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ -1 & 1 & 0 & 1 & 0 & 0 \\ 0 & -1 & 1 & 0 & 0 & -1 \end{vmatrix}$$

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- 2. Write a short note on source shifting and source transformation.

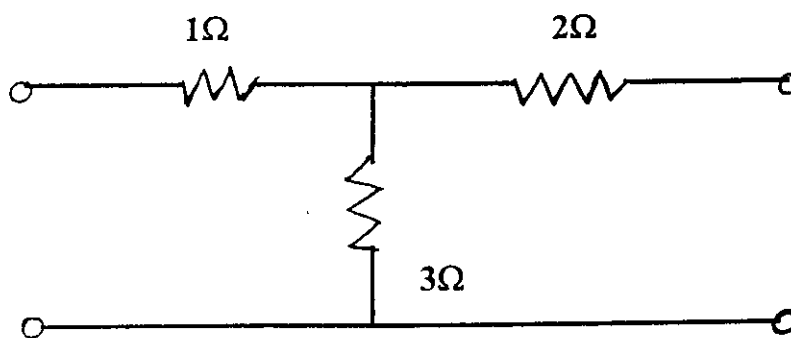
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- 3. Current in 2Ω resistor is $I = 3A$. If R is changed to 3Ω , find new value of I



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- 4. Determine parameter Z_{22} and A for the network shown.

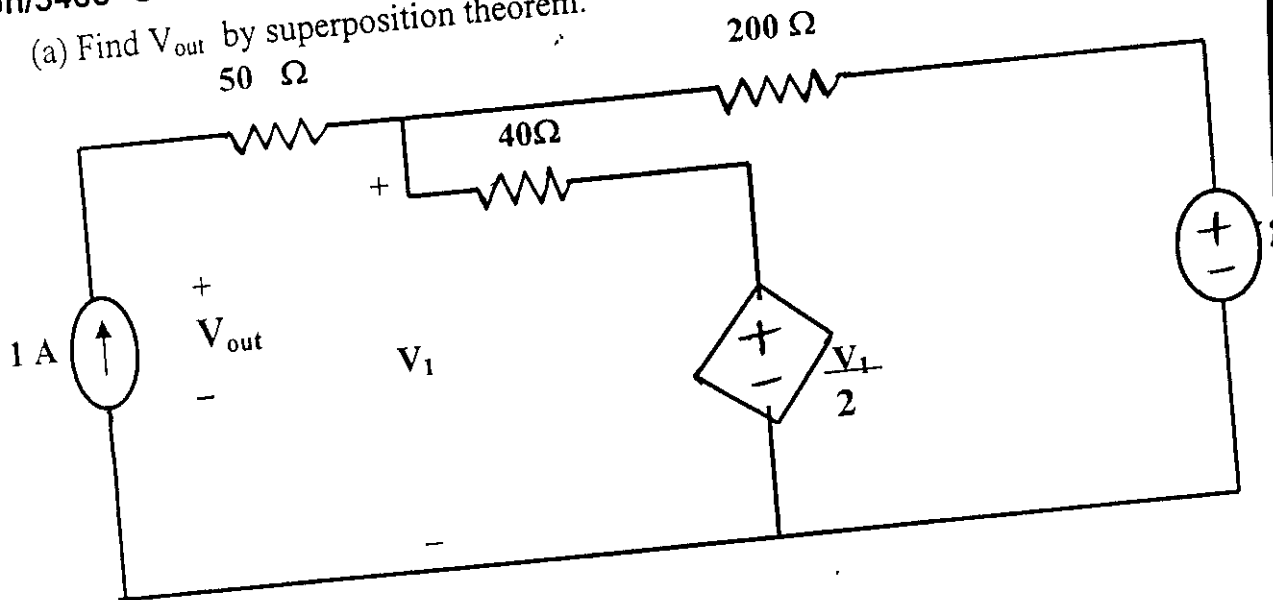


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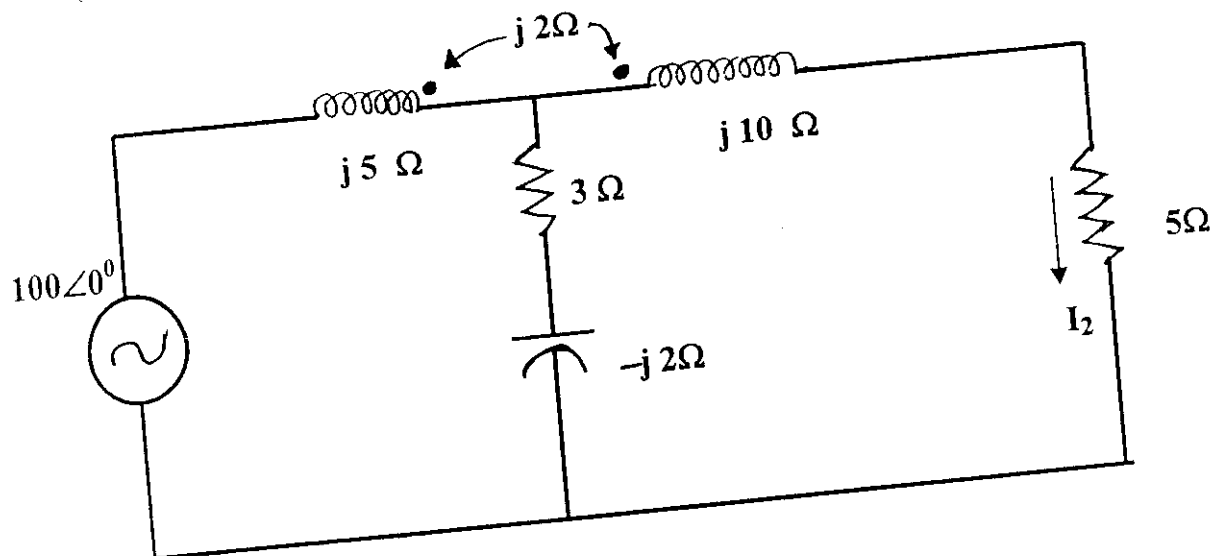
- 5. Write short note on initial condition and its significance.

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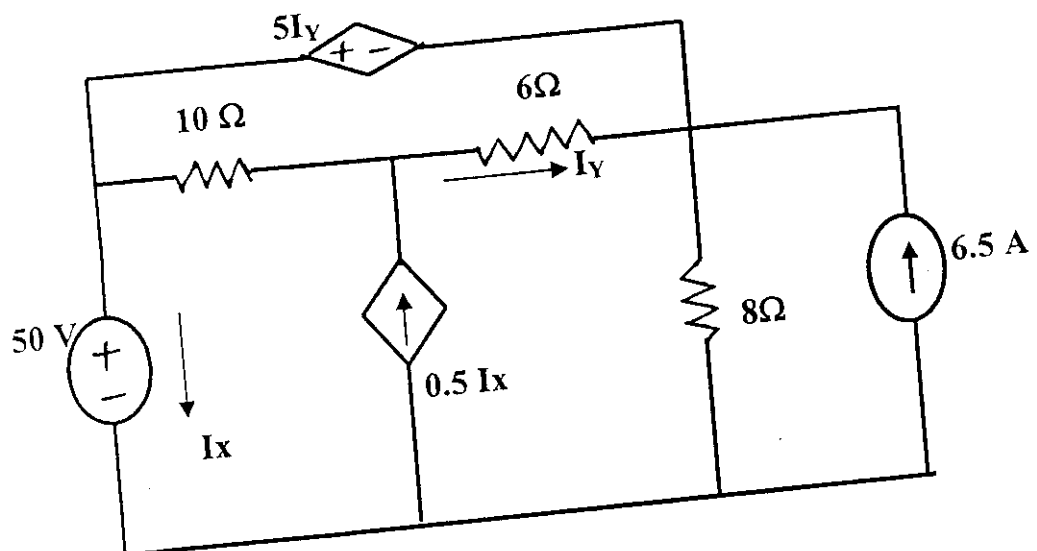
2 (a) Find V_{out} by superposition theorem.



(b) Find I_2 by mesh analysis.

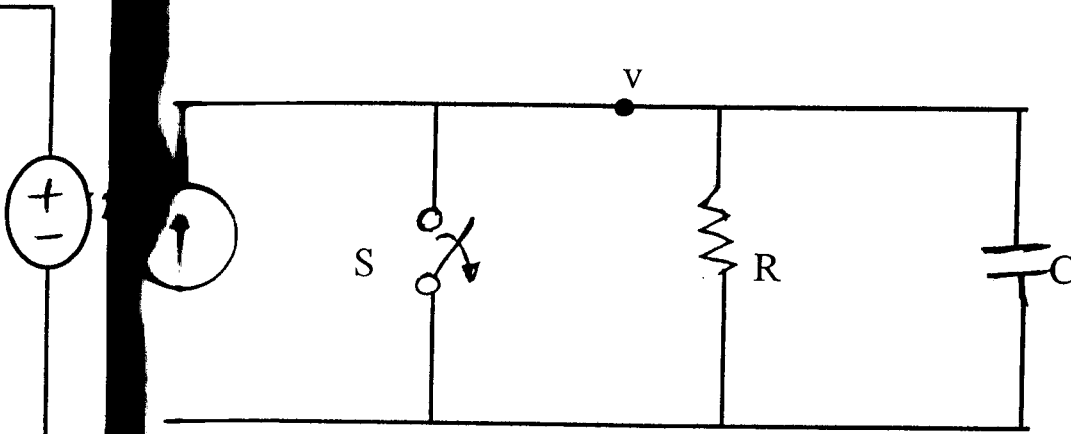


3 (a) Use mesh analysis and find all branch currents.



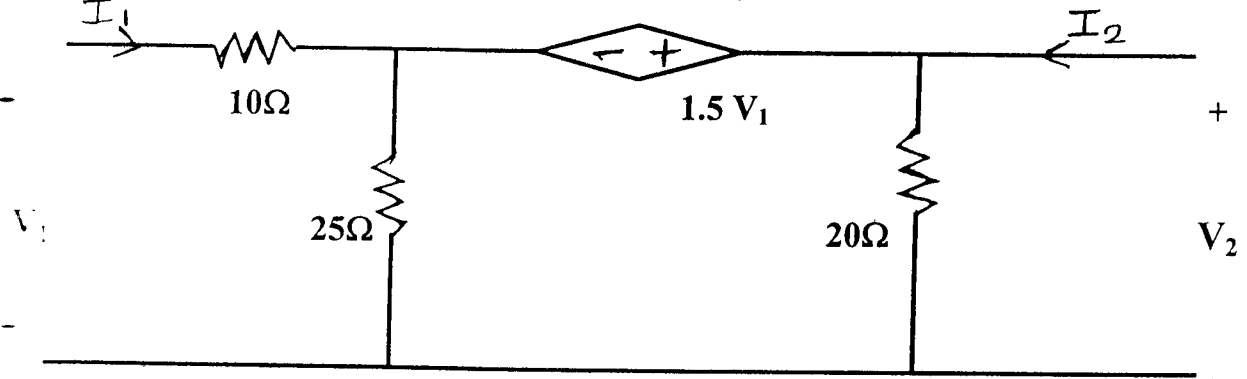
is opened at $t = 0$. Solve for v , $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t = 0^+$

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4 (a) Find the transmission parameter for the two-port network shown.

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5Ω

b) The Z parameter of a two port network are $Z_{11} = 20 \Omega$, $Z_{22} = 30 \Omega$, $Z_{21} = Z_{12} = 10 \Omega$. Find Y and ABCD parameter of the network. Also find its equivalent T network

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5 (a) Test whether following functions are positive real or not.

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i) $\frac{S+2}{S^2+3S+2}$ (ii) $\frac{S^2+6S+2}{S^2+3S+5}$

b) $Y(S) = \frac{(S+2)(S+5)}{S(S+4)(S+6)}$ synthesize using Cauer-I and Cauer-II form.

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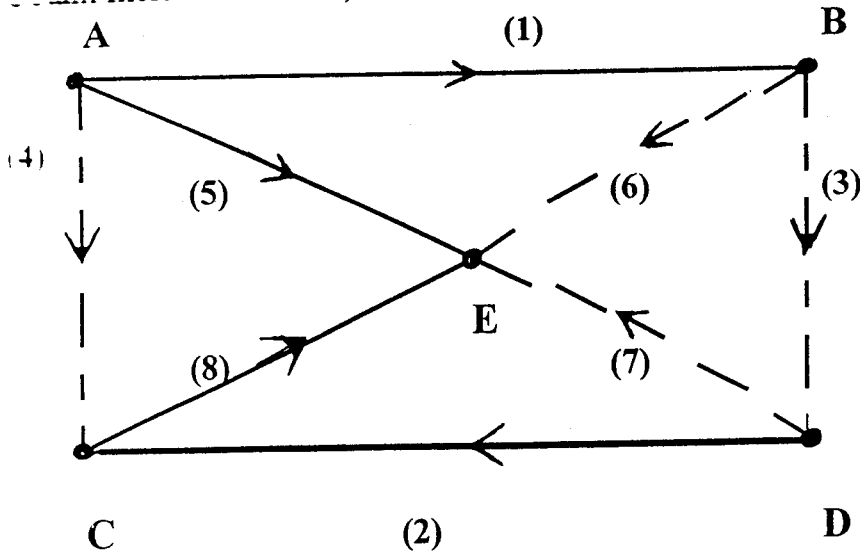
6 (a) Define and with suitable example differentiate between

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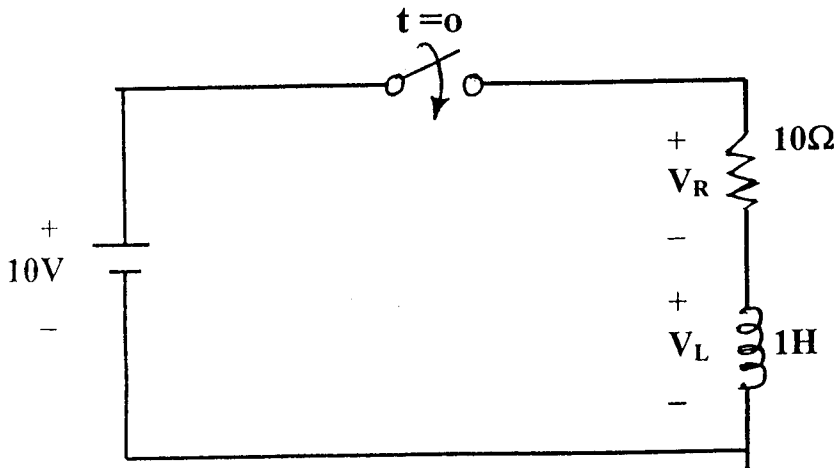
- i) Tree and Cotree
- ii) f-cutset matrix and Tieset matrix
- iii) Planer and nonplaner graph.

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Obtain Incidence matrix, Tieset matrix and f-cutset matrix for the graph shown.



7 (a) For a series RL circuit, a constant voltage is applied at $t=0$. At what time does $V_R=V_L$?



(b) In the network shown the switch is opened at $t = 0$ when steady state condition has been reached previously. Find $i(t)$ for $t>0$ for open switch position. Use Laplace method.

