SE(Biomed) - Sem III CBGS

EMAS

Electrical Network Analysis & Synthesis

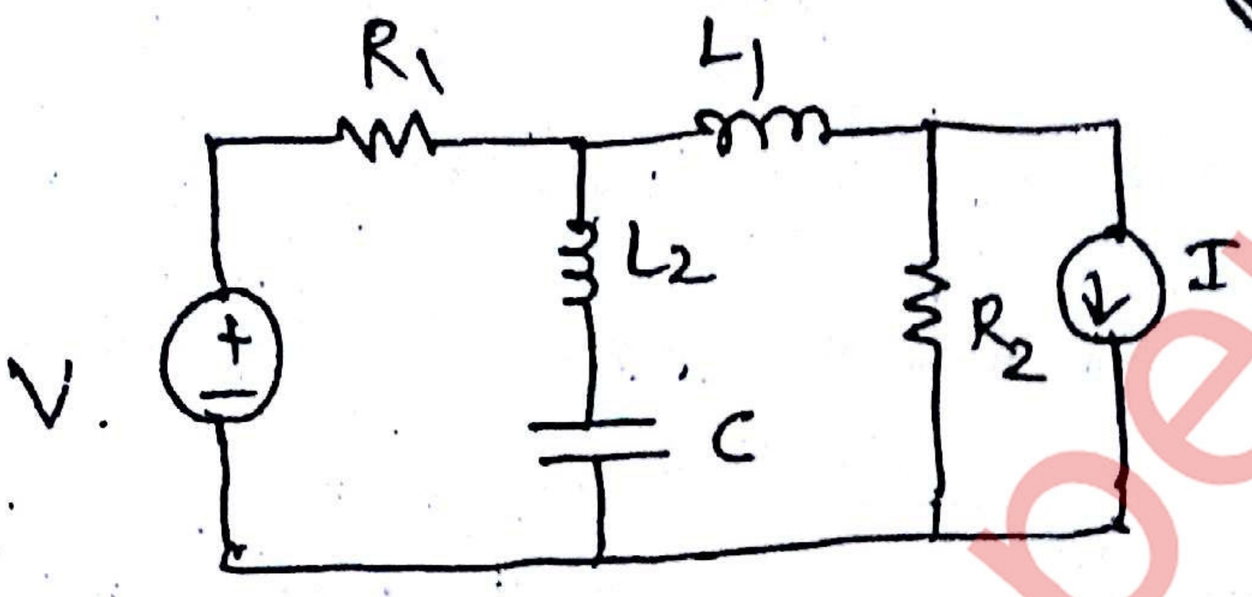
QP Code : NP-18761 (1)

(3 Hours) [Total Marks : 80

N. B. : (1) Attempt **any four** questions out of **six** questions.
(2) Assume any suitable data if required.
(3) Figures to the right indicate full marks.

19

1. (a) Draw the dual of the following network:



(b) Draw oriented graph and show one tree 5

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

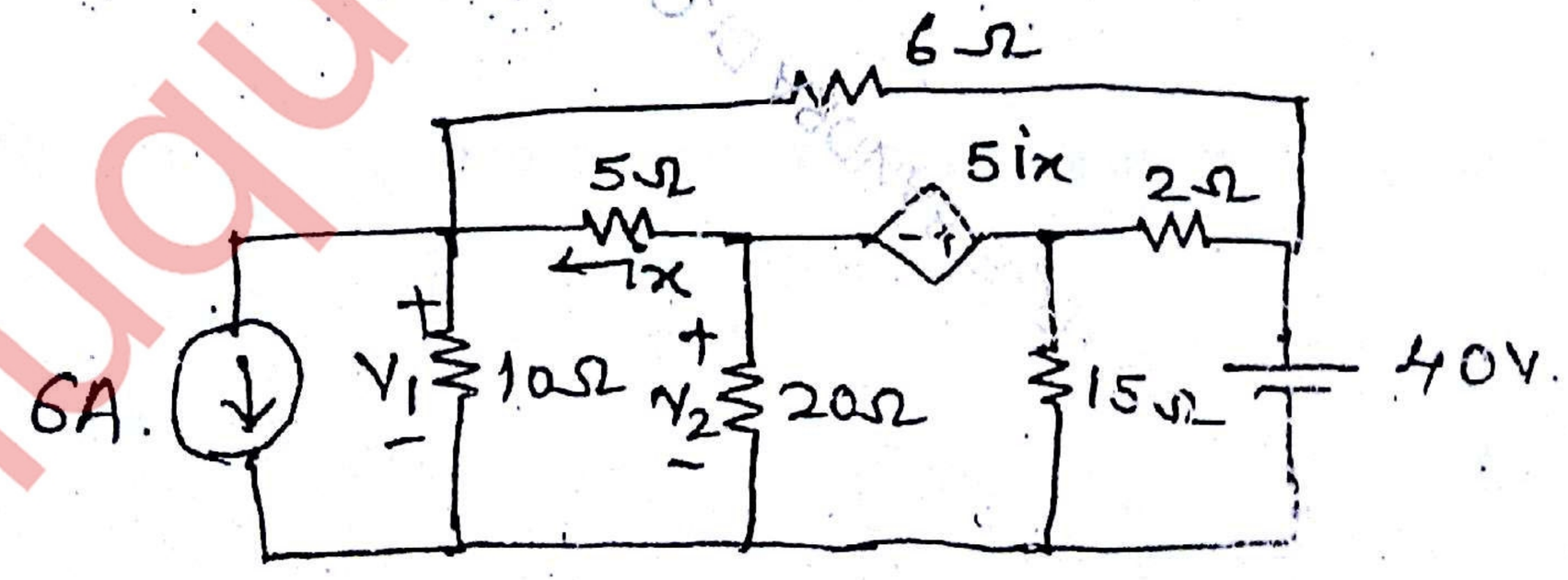
(c) Write a short note on initial condition and its significance 5

(d) Prove that 5

$$A = \frac{Z_{11}}{Z_{21}},\ B = \frac{\Delta Z}{Z_{21}},\ C = \frac{1}{Z_{21}},\ D = \frac{Z_{22}}{Z_{21}}$$

Where A, B, C, D are transmission parameters and Z_{11}, Z_{12}, Z_{21}, Z_{22} are Z-parameters.

2. (a) Find the nodal voltages in the circuit shown in figure. 10



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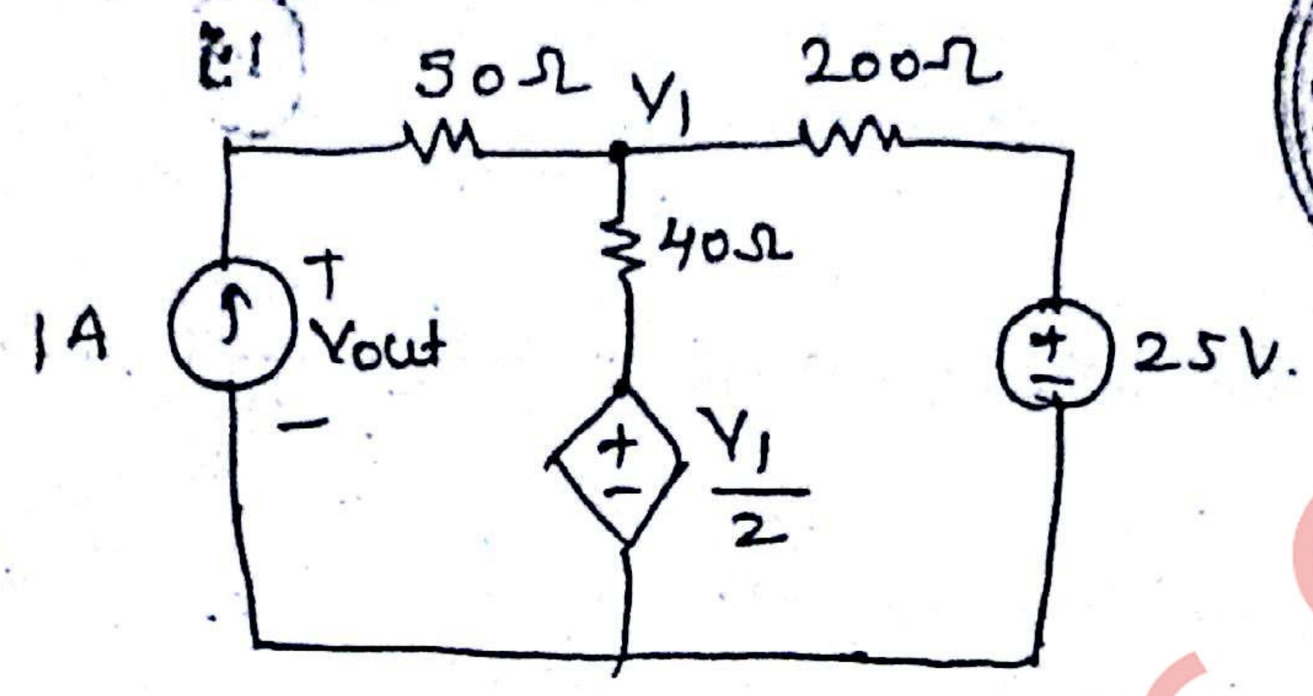
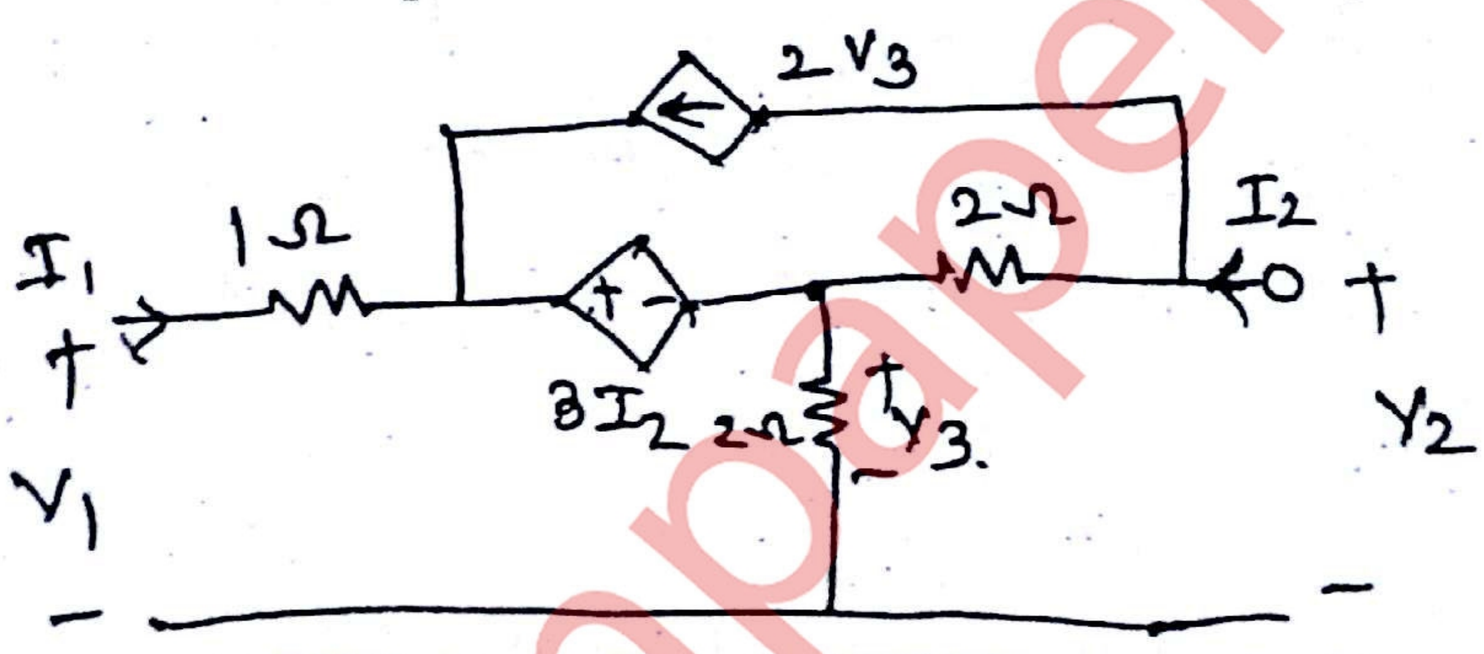
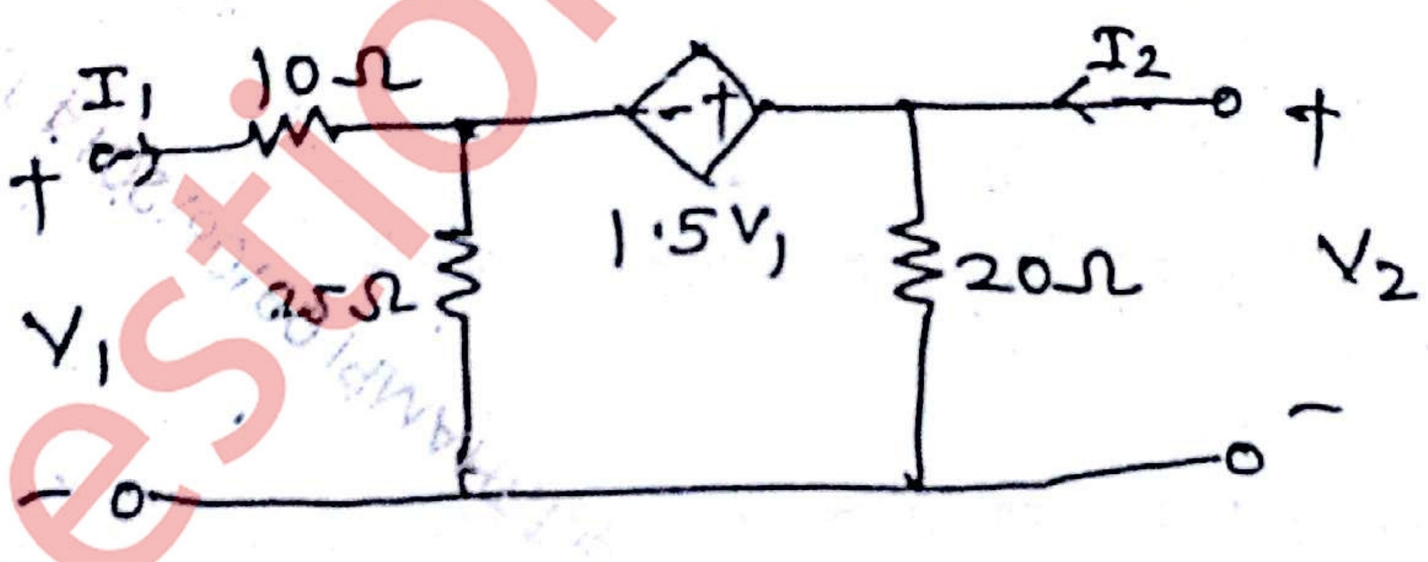
(b) Find Vout by superposition theorem.



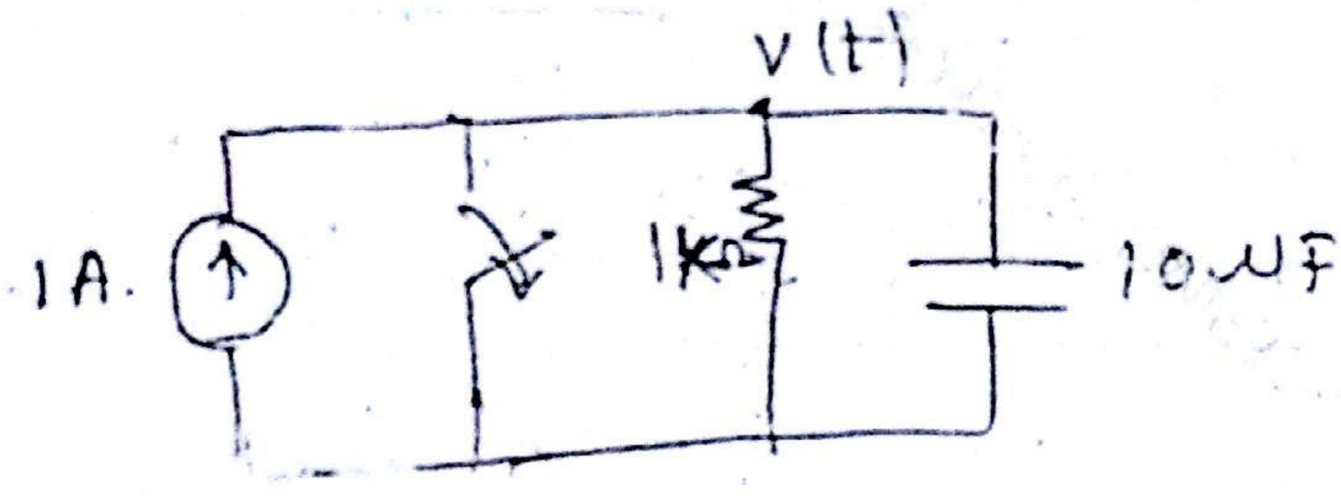
3. (a) Determine Z and Y parameters of the network shown in figure 1



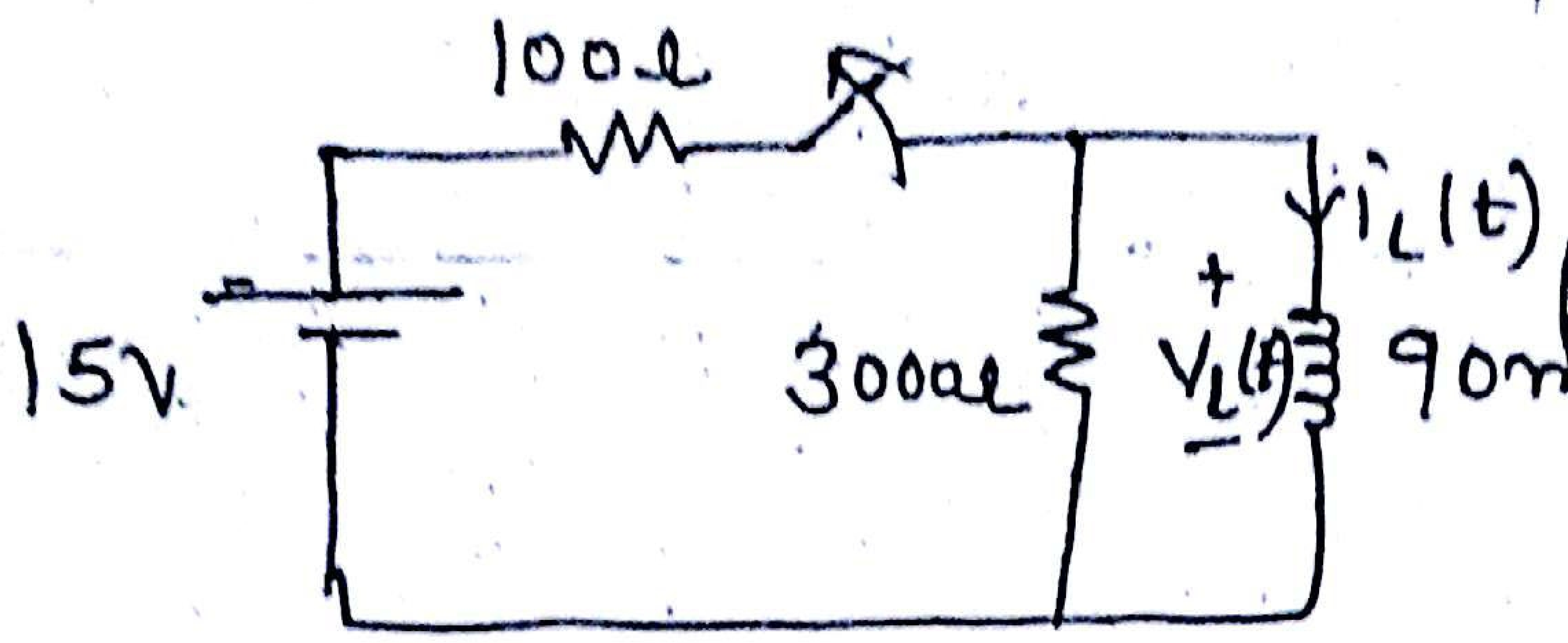
(b) Find the transmission parameter for the two part network shown below 1



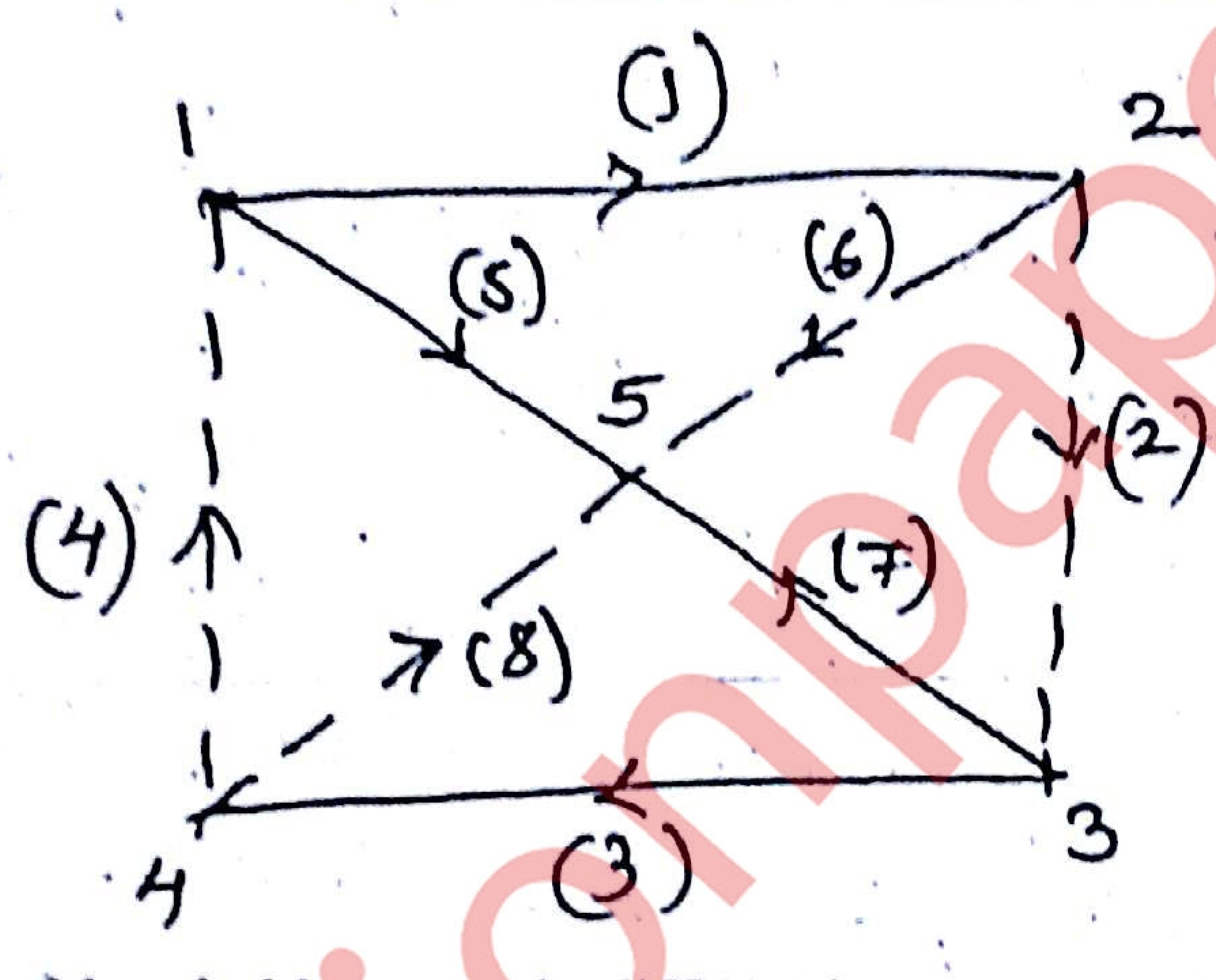
4. (a) In the given network switch is opened at t = 0 solve for v, $\frac{dv}{dt}$, $\frac{d^2v}{dt^2}$ at $t = 0^+$. 1



(b) For the network shown in figure, steady state is reached with the switch closed. The switch is opened at $t = 0$. Obtain expression for $i_L(t)$ and $V_L(t)$ for $t > 0$. **10**



5. (a) Obtain incidence matrix, tieset matrix and f-cutset matrix for the graph shown **15**



(b) Define and with suitable example differentiate between planar and non planar graph. **5**

6. Realize the Foster forms and Cauer forms of the following impedance function. **20**

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

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