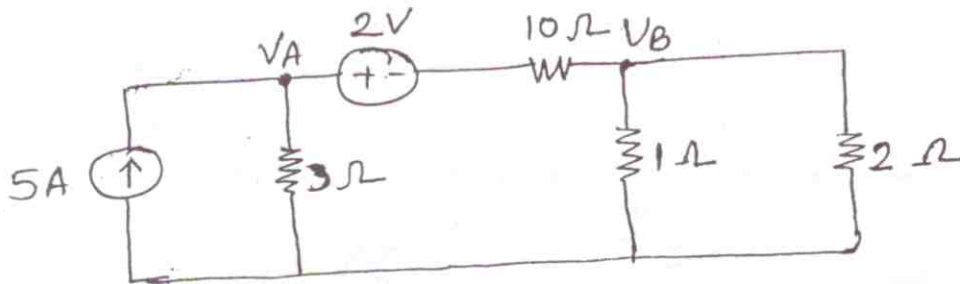


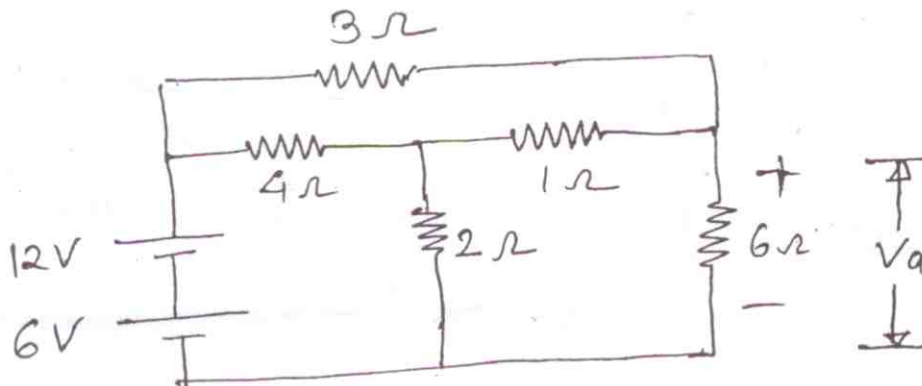
- N.B.: (1) Question No. 1 is compulsory.
 (2) Attempt any **four** questions out of the remaining **six** questions.
 (3) Assume any **suitable** data if **required**.
 (4) **Figures** to the **right** indicate **full marks**.

1. Attempt the following questions :—

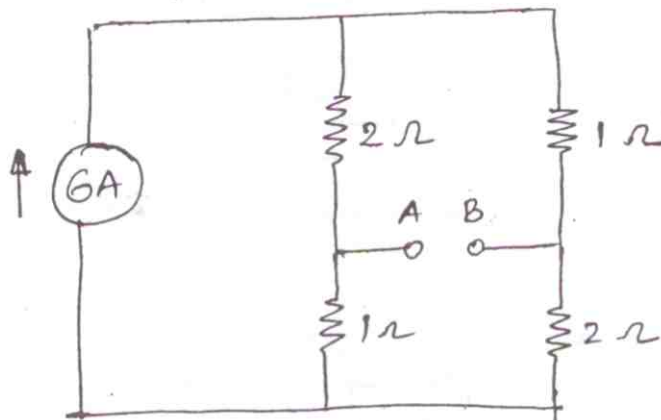
(a) Find V_A and V_B



(b) Using source shifting technique calculate V_a across 6Ω resistor

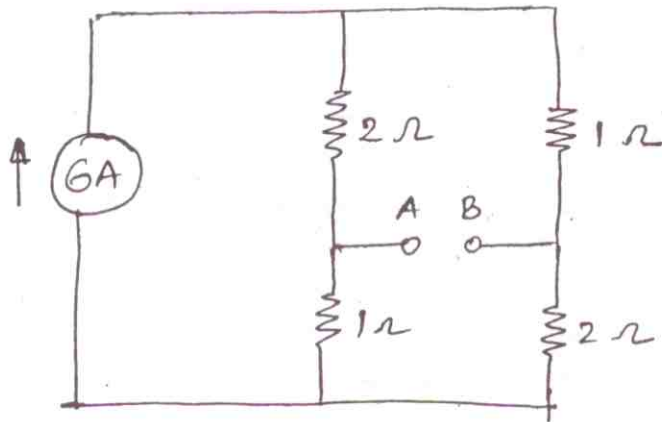


(c) Find Thevenin's equivalent resistance across A-B for the network shown below :



(c) Find Thevinin's equivalent resistance across A-B for the network shown below :

5



(d) Given :

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

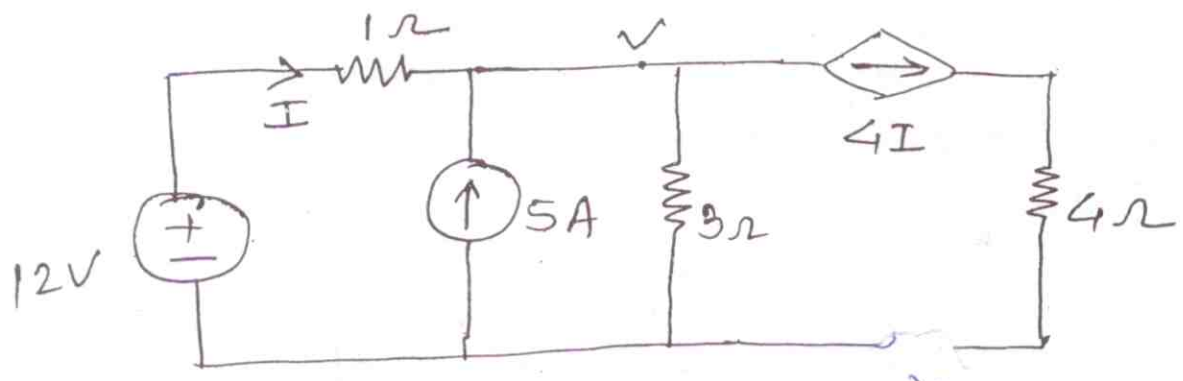
5

Draw oriented graph and find total number of trees.

[TURN OVER

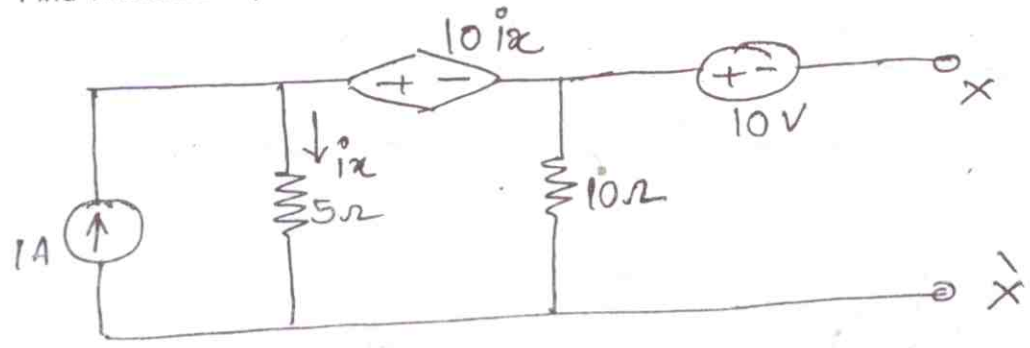
2. (a) Find the current in the 4Ω resistor of the cut using superposition theorem.

10



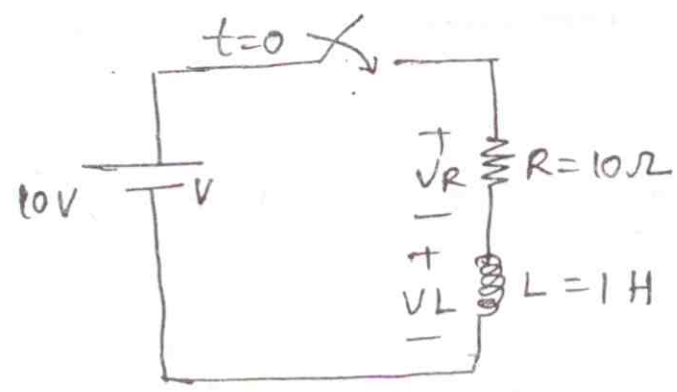
(b) Find Thevenin's equivalent across $X-X'$ in figure below :

10



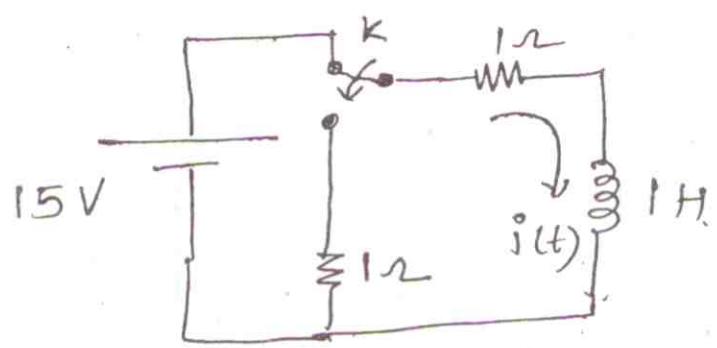
3. (a) A series R-L circuit has a constant voltage V applied at $t = 0$. At what time does $V_R = V_L$ for the network shown below :

10

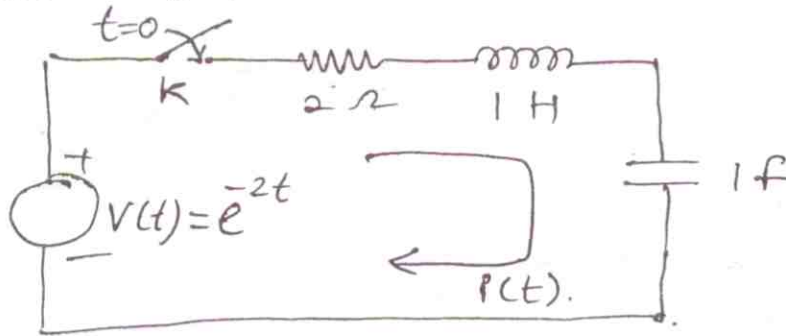


(b) Find $i(0^+)$, $\frac{di}{dt}(0^+)$, $\frac{d^2i}{dt^2}(0^+)$ and $i(t)$ for the network shown below :

10



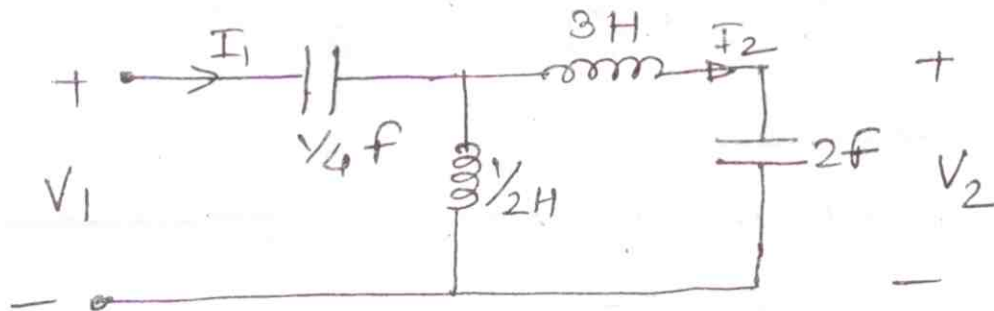
4. (a) For the network shown system is initially at rest and switch 'S' is closed at $t = 0$, find out $i(t)$ for $t > 0$ using Laplace transform 10.



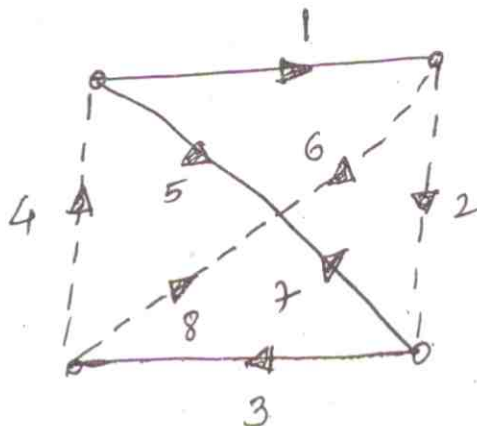
- (b) Write short notes on : 10
 (i) Initial condition and its significance
 (ii) Under damped, over-damped, critically-damped systems.

5. (a) Find the voltage ratio $\frac{V_2}{V_1}$, the current ratio $\frac{I_2}{I_1}$, the input impedance $Z_1 = \frac{V_1}{I_1}$, and 10

the transfer impedance $Z_{21} = \frac{V_2}{I_1}$, for the network shown :

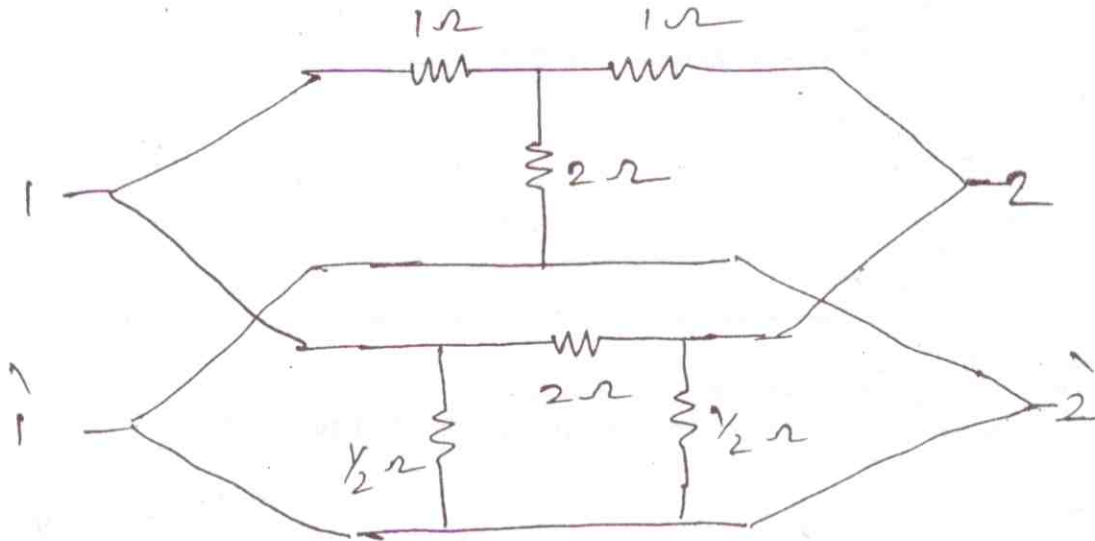


- (b) Linear graph of a network is shown below . Write : 10
 (i) Incidence matrix
 (ii) Fundamental cutset matrix
 (iii) F-tieset matrix.



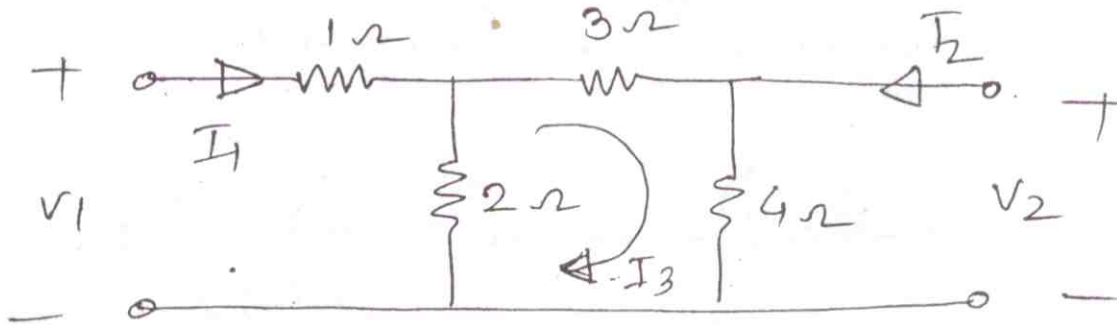
6. (a) Determine y-parameter for the network shown

10



(b) Find ABCD parameters for the n/w shown.

10



7. (a) Test the following for positive real function—

10

$$F(s) = \frac{s^4 + 3s^3 + s^2 + s + 2}{s^3 + s^2 + s + 1}$$

(b) Synthesize the following impedance function in the Cauer-I and Foster-I form

10

$$Z(s) = \frac{s+4}{(s+2)(s+6)}$$