

19/2/2021

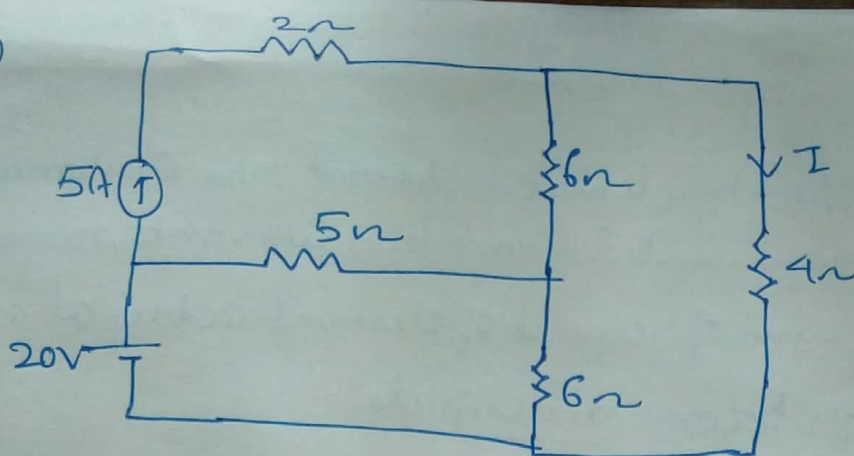
Superposition principle \rightarrow In a linear, bilateral n/w containing more than one independent voltage and current, response in any element is sum of response of element acting at a time while other source become deactivate.

Deactivation mean all the indep. source are replaced by the internal resistance i.e. voltage source is replaced by short ckt, current source is replaced by open ckt and all dep. source remain same.

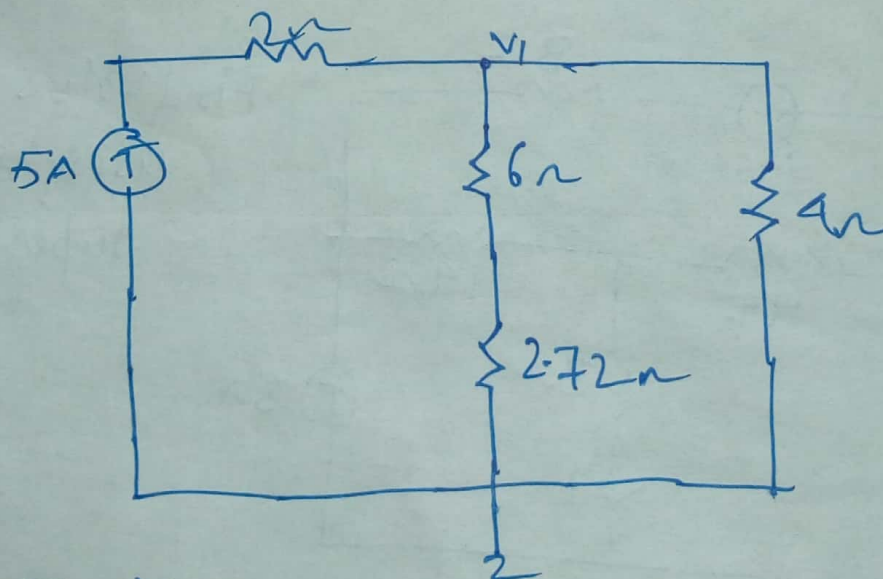
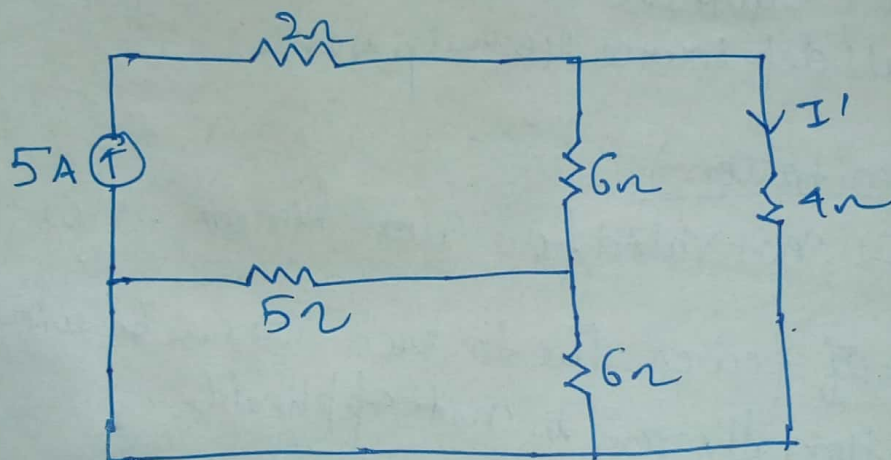
Note: \rightarrow (Limitation)

- (I) not valid for non-linear n/w
- (II) effect of power due to each source by using superposition theorem is not applicable

Q)



Step 1 → Remove 20V Voltage source

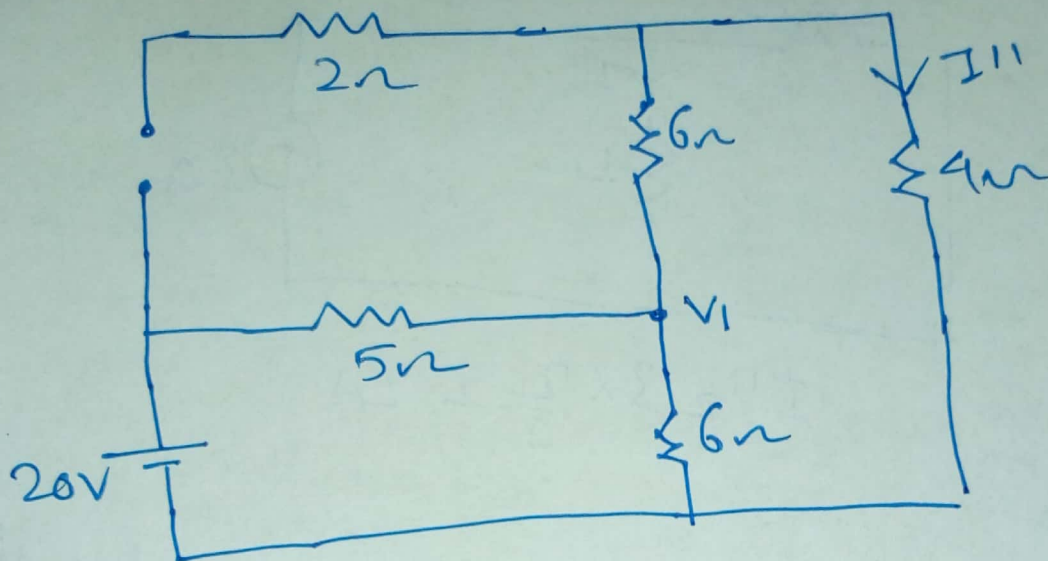


$$5 = \frac{V_1}{4} + \frac{V_1}{8.727}$$

$$V_1 = 13.71$$

$$I' = \frac{13.71}{4} = 3.429A$$

When 20V Voltage source active alone



$$\frac{V_1 - 20}{5} + \frac{V_1}{6} + \frac{V_1}{10} = 0$$

$$V_1 \cdot \frac{7}{15} = 4$$

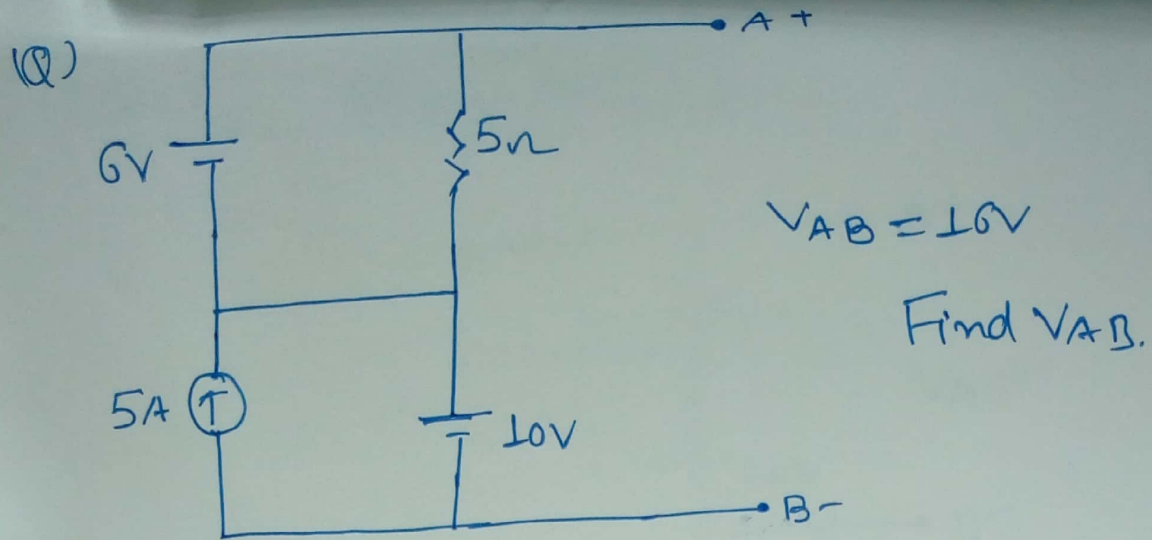
$$V_1 = \frac{60}{7} = 8.571V$$

$$I'' = \frac{V_1}{10} = 0.8571A$$

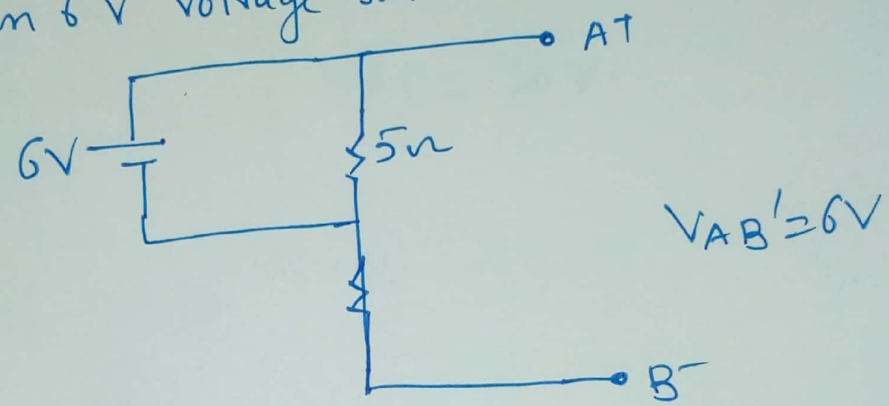
$$I = I' + I''$$

$$I = 4.286A$$

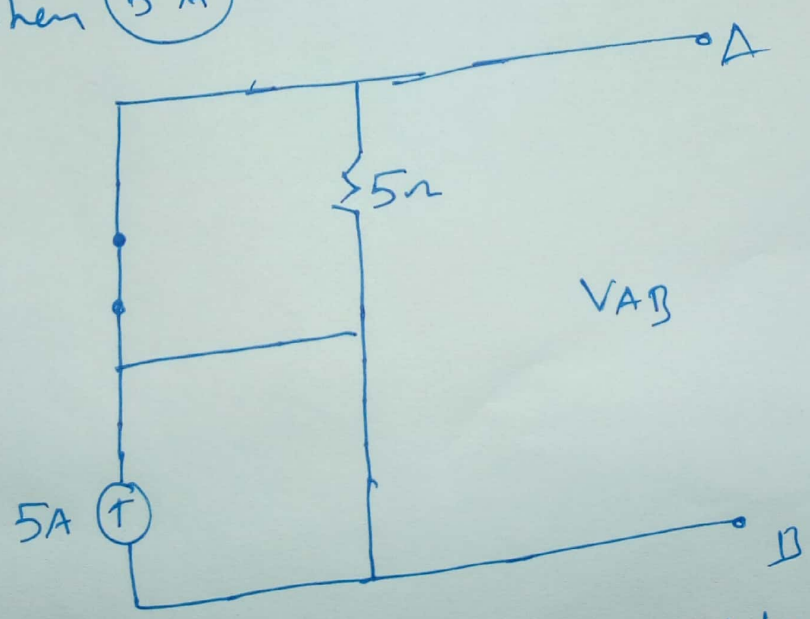
Find I through 1Ω resistor by using Superposition



Step 1. When 6V Voltage source is alone



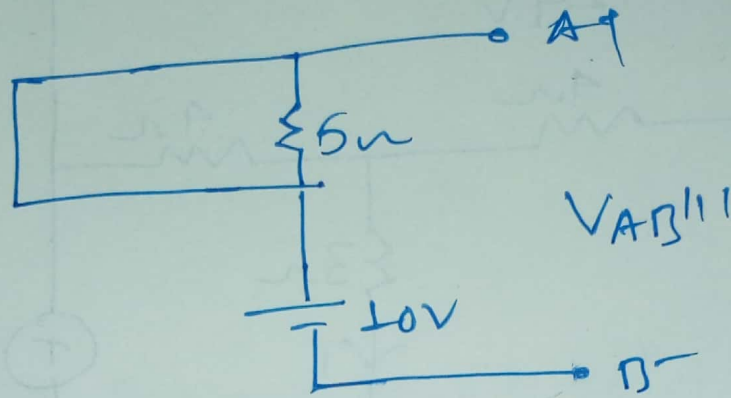
Step 2. When $5A$



Current will flow through low resistance path $V_{AB} = 20V$

Step 2 When 3A Current source acting alone

Step 3 When 10V



$$V_{AB}''' = 10V$$

$$V_{AB} = 10V.$$