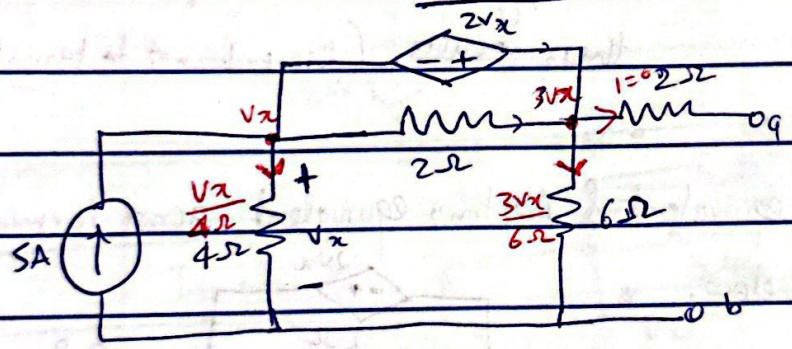
Answers

Ans. 1)



Thevenin's equivalent

$V_{open\ circuit}$.

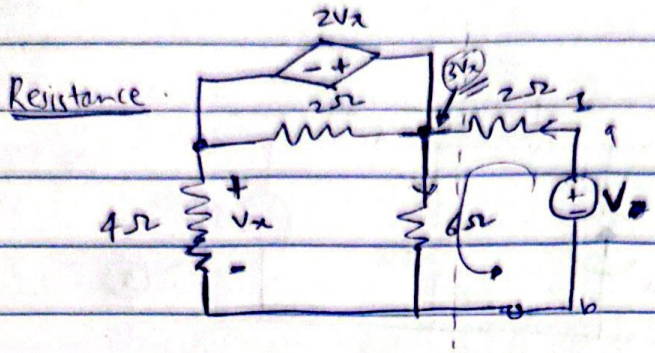
$$5A = \frac{V_x}{4\Omega} + \frac{3V_x}{6\Omega}$$

$$5A = \frac{2V_x + 4V_x}{8\Omega}$$

$$6V_x \Rightarrow 40$$

$$\boxed{V_{ab} \Rightarrow 3V_x \Rightarrow 20V}$$

Resistance.



$Req \Rightarrow \frac{V}{I}$

$$I = \frac{3V_x}{6\Omega} + \frac{V_x}{4\Omega} \Rightarrow \frac{6V_x}{8} \quad -(1)$$

$$V \Rightarrow 2I + 3V_x$$

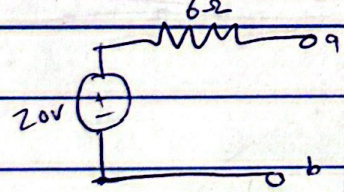
$$V = \frac{2 \times 6V_x}{8} + 3V_x$$

$$V \Rightarrow \frac{3V_x}{2} + 3V_x \Rightarrow \frac{9}{2}V_x \quad -(2)$$

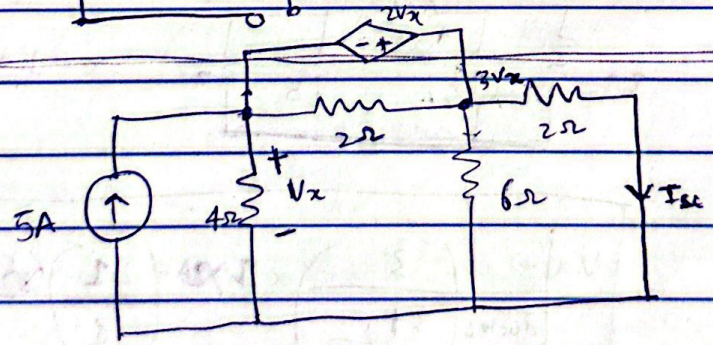
$$I = \frac{6 \times 2V}{8 \times 9}$$

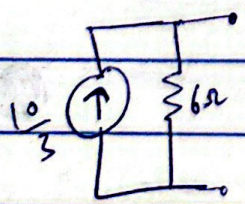
$$I = \frac{1}{6}V$$

$$\frac{V}{I} = 6\Omega$$



I_{sc} :-





$$5 = \frac{V_x}{4\Omega} + \frac{3V_x}{6\Omega} + \frac{3V_x}{2\Omega}$$

$$5 = \frac{V_x}{4} + 2V_x$$

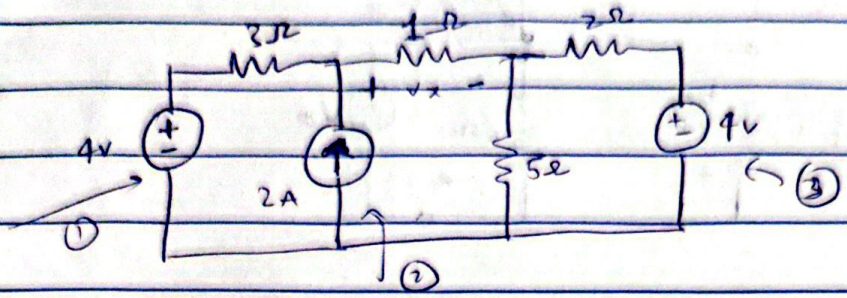
$$5 \Rightarrow \frac{9V_x}{4}$$

$$V_x \Rightarrow \frac{20}{9}$$

$$I_{sc} \Rightarrow 3 \times \frac{20}{9} \times \frac{1}{2}$$

$$I_{sc} \Rightarrow \frac{10}{3}$$

Ans.2



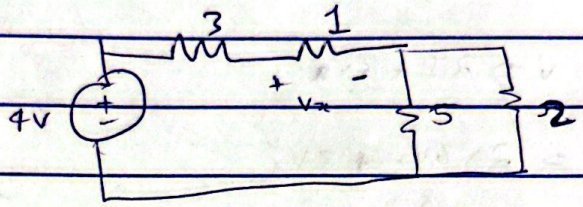
Total

$\Rightarrow \frac{28}{38} + \frac{42}{38} - \frac{20}{38}$

$\Rightarrow$ **1.315 V**

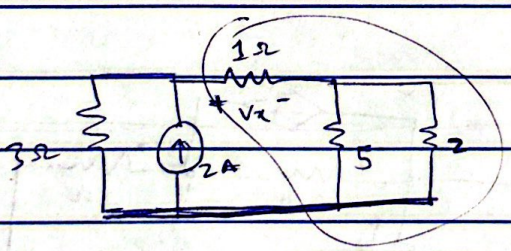
3 independent sources

due to (1)



$$V_x|_{\text{due to 1}} \Rightarrow \frac{1}{1+3+\frac{2\times5}{7}} \times 4V \Rightarrow \frac{1}{4+\frac{10}{7}} \times 4 \Rightarrow \frac{28}{38} V$$

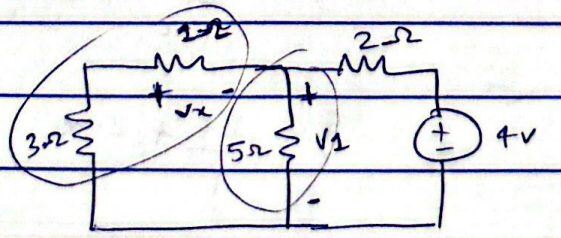
due to (2)



$$\Rightarrow 1 + \frac{5\times2}{7} \Rightarrow \frac{17}{7}$$

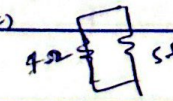
$$V_x|_{\text{due to 2}} \Rightarrow \left(\frac{3}{3+\frac{17}{7}}\right) \times 1 \times 2A \Rightarrow \left(\frac{21}{38}\right) \times 2 \Rightarrow \frac{42}{38} V$$

due to (3)



$$V_1 \Rightarrow \frac{\frac{20}{9}}{\frac{20}{9}+2} \times 4V$$

eq $\Rightarrow$



$\Rightarrow \frac{5\times4}{9} \Rightarrow \frac{20}{9}$

$$V_x|_{\text{due to 3}} \Rightarrow -\frac{1}{4} \times V_1 \Rightarrow -\frac{20}{38}$$