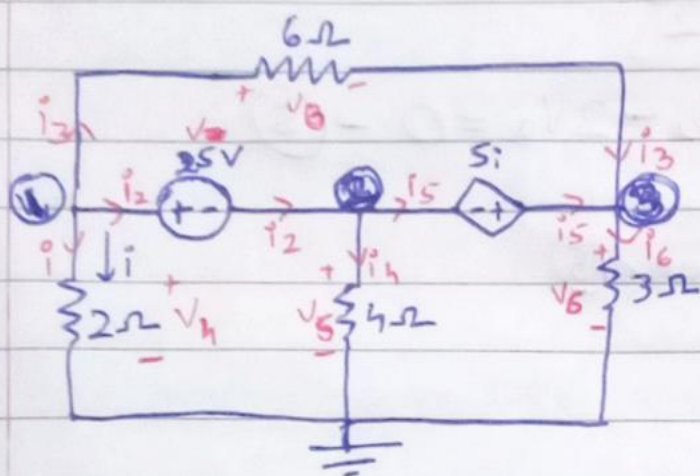


03



KCL at node ①:  $\sum I_{\text{entering}} = \sum I_{\text{leaving}}$

$$0 = i_1 + i_2 + i_3$$

$$\Rightarrow i_2 = -i_1 - i_3$$

$$\Rightarrow i_2 = -\frac{V_1}{2} - \left(\frac{V_1 - V_3}{6}\right) \quad \text{--- (1)}$$

$$i_3 = \frac{V_2}{6} = \frac{V_1 - V_3}{6}$$

$$i_1 = \frac{V_4}{2} = \frac{V_1}{2}$$

KCL at node ②:  $\sum I_{\text{entering}} = \sum I_{\text{leaving}}$

$$i_2 = i_5 + i_4$$

$$\Rightarrow -\frac{V_1}{2} - \left(\frac{V_1 - V_3}{6}\right) = i_5 + \frac{V_2}{4} \quad \text{--- (2)}$$

$$i_4 = \frac{V_2}{4}$$

KCL at node 3:  $\sum I_{\text{entering}} = \sum I_{\text{leaving}}$

$$i_3 + i_5 = i_6$$

$$i_6 = \frac{V_6}{3} = \frac{V_3}{3}$$

$$\frac{V_1 - V_3}{6} - \frac{V_1}{2} - \left( \frac{V_1 - V_3}{6} \right) - \frac{V_2}{4} = \frac{V_3}{3}$$

$$\frac{V_3}{3} + \frac{V_2}{4} + \frac{V_1}{2} = 0$$

$$\Rightarrow 4V_3 + 3V_2 + 6V_1 = 0 \quad \text{--- (3)}$$

$$V_1 - V_2 = 25 \Rightarrow V_1 = 25 + V_2 \quad \text{--- (4)}$$

for

$$V_3 - V_2 = 5i = 5V_1$$

$$\Rightarrow 5V_1 + 2V_2 - 2V_3 = 0 \quad \text{--- (5)}$$

Put (4) in (3) and (5)

$$9V_2 + 4V_3 = -150$$

$$7V_2 - 2V_3 = -125$$

$$\Rightarrow 9V_2 + 4V_3 = -150$$

$$14V_2 - 4V_3 = -250$$

$$23V_2 = -400$$

$$\Rightarrow V_2 = -\frac{400}{23}$$

$$\Rightarrow V_2 = -17.39 \Rightarrow V_1 = 7.608V = 25 - \left( \frac{400}{23} \right)$$

$$\Rightarrow V_3 = 1.6305 = \frac{7 \left( -\frac{400}{23} \right) + 125}{2}$$