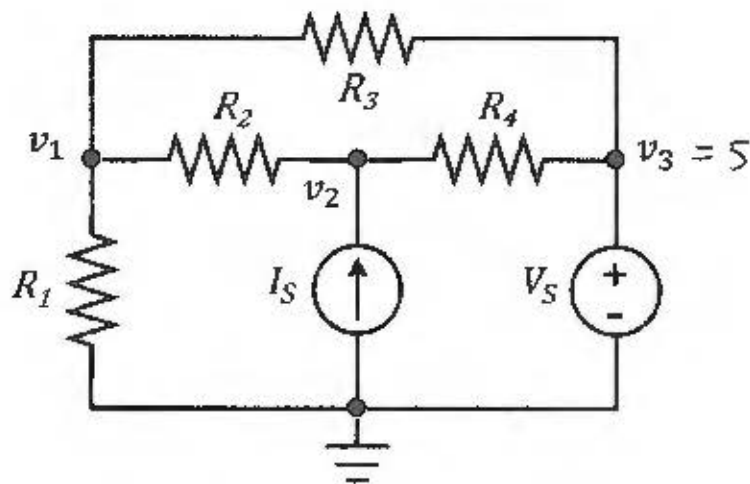


Find the node voltages  $v_1$ ,  $v_2$  and  $v_3$ .  
Use nodal analysis.



$$R_1 = 2 \, \Omega$$

$$R_2 = 1 \, \Omega$$

$$R_3 = 1 \, \Omega$$

$$R_4 = 2 \, \Omega$$

$$V_s = 5 \, \text{V}$$

$$I_s = 1 \, \text{A}$$

$$v_3 = V_s \Rightarrow \boxed{v_3 = 5 \, \text{V}}$$

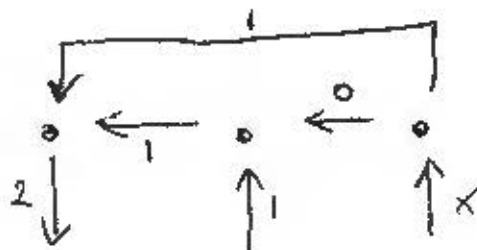
$$\textcircled{*} \text{ KCL @ 1: } \frac{v_1}{2} + \frac{v_1 - 5}{1} + \frac{v_1 - v_2}{1} = 0 \Rightarrow 5v_1 - 2v_2 = 10 \quad (1)$$

$$\textcircled{*} \text{ KCL @ 2: } \frac{v_2 - v_1}{1} + \frac{v_2 - 5}{2} - 1 = 0 \Rightarrow -2v_1 + 3v_2 = 7 \quad (2)$$

$$\textcircled{*} \quad 3 \times (1) + 2 \times (2): \quad 11v_1 = 44 \Rightarrow \boxed{v_1 = 4 \, \text{V}}$$

$$\boxed{v_2 = 5 \, \text{V}}$$

CHECK KCL



$$x = 1$$