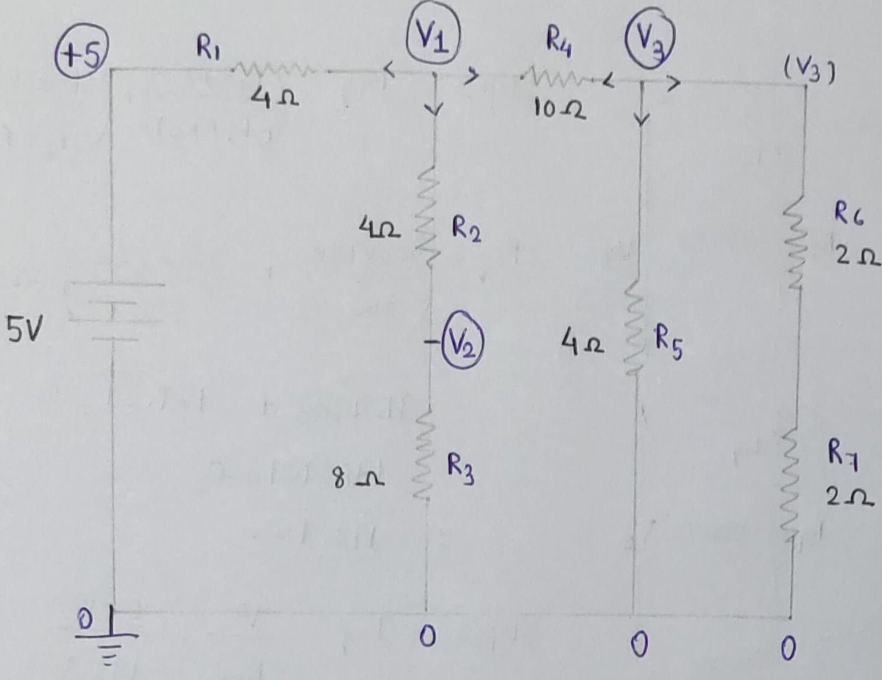
ASSIGNMENT - 2 (U19CS012)



Step 1 : Solving using Node Analysis

Two Junction points as shown in figure (V_1 & V_3)

At Node V_1

$$\frac{V_1 - 5}{4} + \frac{V_1}{(4+8)} + \frac{V_1 - V_3}{10} = 0$$

$$V_1\left(\frac{1}{4} + \frac{1}{12} + \frac{1}{10}\right) - 0.1 V_3 = 1.25$$

$$\boxed{0.433\, V_1 - 0.1 V_3 = 1.25} \quad Eq^n \ 1$$

Step 2 : At Node V_3 :

$$\frac{V_3 - V_1}{10} + \frac{V_3}{4} + \frac{V_3}{(2+2)} = 0$$

$$V_3\,(0.6) - 0.1\, V_1 = 0$$

$$\boxed{V_1 = 6 V_3} \longrightarrow Eq^n \ 2$$

$$V_3\,(0.433 \times 6 - 0.1) = 1.25$$

$$V_3 = 0.5004 \text{ V}$$

$$\boxed{V_3 \simeq 0.5V}$$

$$\boxed{V_1 = 3V}$$

Across Resistor	Voltage (volt)	Current
R_1	$5 - V_1 = \boxed{2V}$	$I_{R_1} = \frac{V_{R_1}}{(R_1)} = \frac{2V}{4\Omega} = 0.5A - \boxed{500\ mA}$
R_2	$V_{R_2} = I_{R_2} \times R_2 = (0.25A) \times 4\Omega = \boxed{1V}$	$I_{R_2} = \frac{V_1}{(R_2 + R_3)} = \frac{3}{12} = 0.25A = \boxed{250\ mA}$
R_3	$V_{R_3} = I_{R_3} \times R_3 = 0.25 (A) \times 8 (\Omega) = \boxed{2V}$	$I_{R_3} = I_{R_2} = 0.25A = \boxed{250\ mA}$
R_4	$V_{R_4} = V_1 - V_3 = \boxed{2.5V}$	$I_{R_4} = \frac{V_{R_4}}{R_4} = \frac{2.5V}{10\Omega} = \boxed{250\ mA} = 0.25A$
R_5	$V_{R_5} = V_3 = \boxed{0.5V}$	$I_{R_5} = \frac{V_{R_5}}{R_5} = \frac{0.5}{4} = 0.125A = \boxed{125\ mA}$
R_6	$V_{R_6} = I_{R_6} \times R_6 = \boxed{0.25V}$	$I_{R_6} = \frac{V_3}{(R_6 + R_7)} = \frac{0.5}{4} = \boxed{125\ mA}$
R_7	$V_{R_7} = I_{R_7} \times R_7 = \boxed{0.25V}$	$I_{R_7} = I_{R_6} = \boxed{125\ mA}$