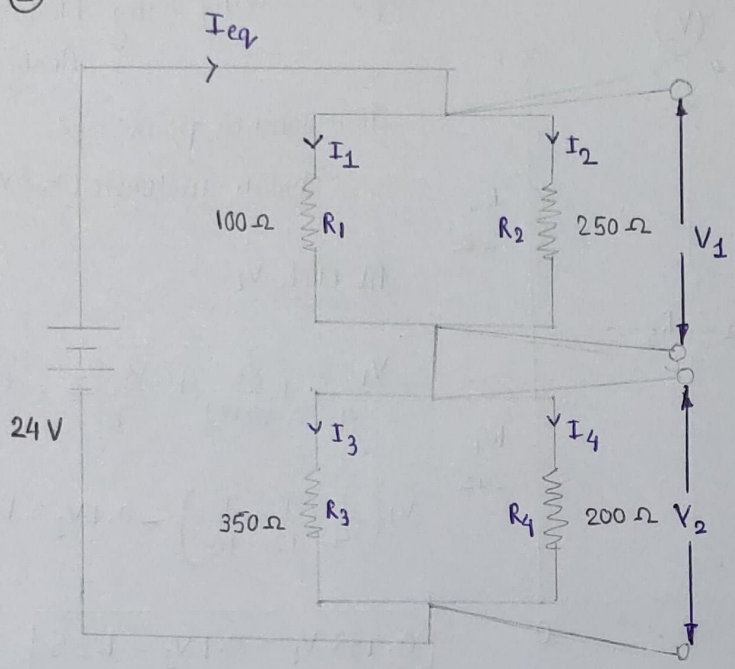
# ASSIGNMENT - 1 (U19CS012)

(1)




Step 1: $R_{eq} = \left(\frac{R_1 \times R_2}{(R_1 + R_2)}\right) + \left(\frac{R_3 \times R_4}{R_3 + R_4}\right) \Omega$

$R_{eq} = \left(\frac{250 \times 100}{350} + \frac{350 \times 200}{550}\right) \Omega$

$= 71.4286 + 127.\overline{27}\ \Omega$

$= 198.7013\ \Omega$

$\approx \underline{198.7\ \Omega}$

Step 2: $I_{eq} = \frac{V}{R_{eq}} = \frac{24\ V}{198.7\ \Omega}$

$= 0.120785\ A$

$= \underline{120.785\ mA}$

Step 3: Parallel

$V_1 = I_1 R_1 \quad -(i) \qquad V_1 = I_2 R_2 \quad -(ii)$

$\therefore I_1 R_1 = I_2 R_2 \quad -(1)$

$I_1 + I_2 = I_{eq} \quad -(2)$

Derivation (Just for info)

$I_1 = I_{eq} - \left(\frac{I_1 R_1}{R_2}\right) \Rightarrow I_1\left(1 + \frac{R_1}{R_2}\right) = I_{eq} \Rightarrow \boxed{I_1 = \frac{I_{eq}(R_2)}{R_1 + R_2}}$

Similarly $\boxed{I_2 = \frac{I_{eq}(R_1)}{(R_1 + R_2)}}$

$I_1 = \frac{(I_{eq})R_2}{(R_1 + R_2)} = (120.785)\ mA \times \frac{(250)}{(350)} = \boxed{86.275\ mA}$

$I_2 = \frac{(I_{eq})R_1}{(R_1 + R_2)} = (120.785)\ mA \times \frac{(100)}{(350)} = \boxed{34.51\ mA}$

$V_1 = I_1 R_1 = (86.275 \times 10^{-3}\ A) \times (100\ \Omega) = \boxed{8.6275\ V}$

Similarly;

$I_3 = \frac{(I_{eq})R_4}{(R_3 + R_4)} = (120.785)\ mA \times \left(\frac{200}{550}\right) = 43.9218\ mA \approx \boxed{43.922\ mA}$

$I_4 = \frac{(I_{eq})R_3}{(R_3 + R_4)} = (120.785)\ mA \times \left(\frac{350}{550}\right) = \boxed{76.8632\ mA}$

$V_2 = I_3 \times R_3 = (43.922 \times 10^{-3})\ A \times 350\ \Omega = 15.3727\ V \approx \boxed{15.373\ V}$