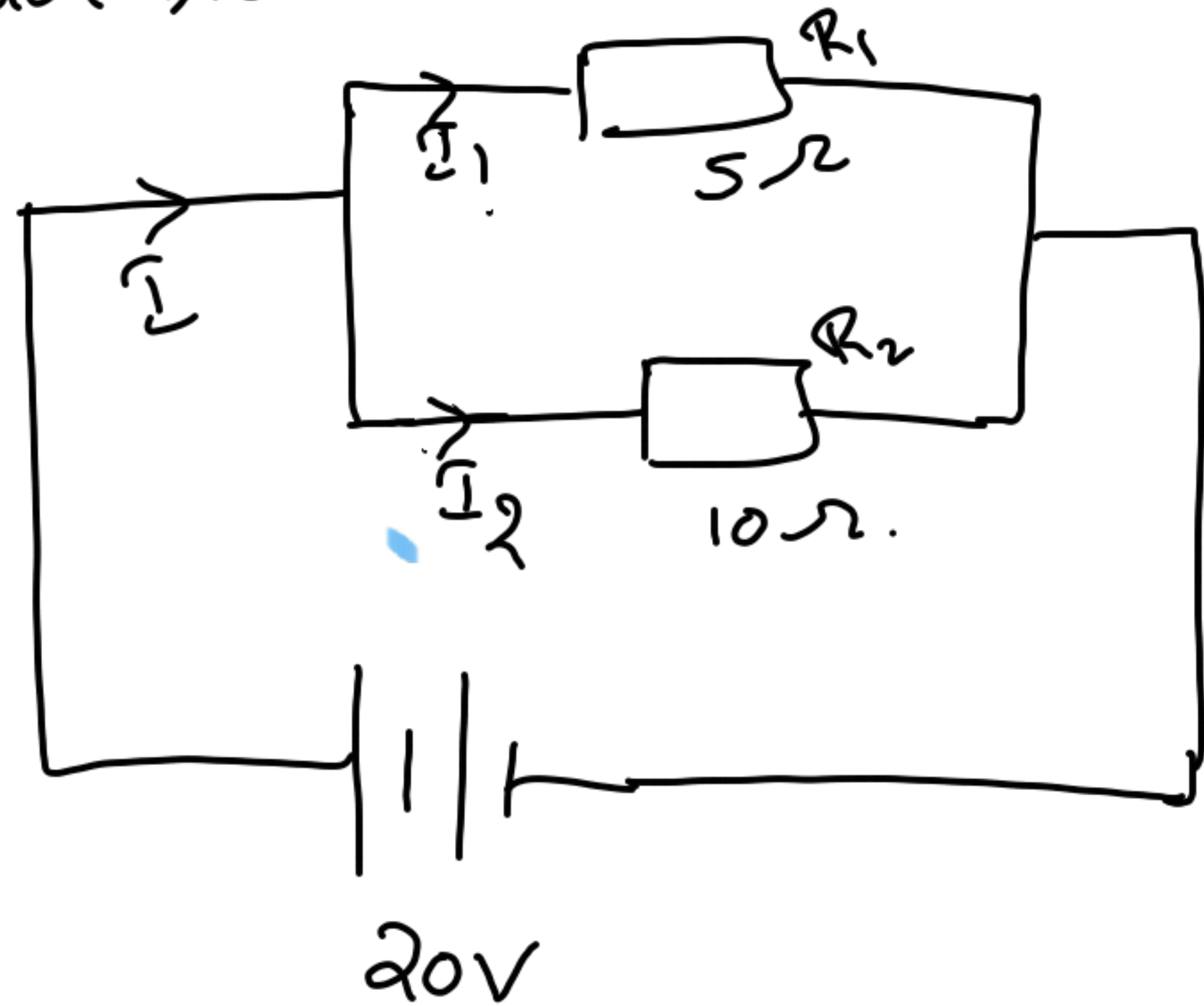


1) Calculate the Current across each branch in the circuit.

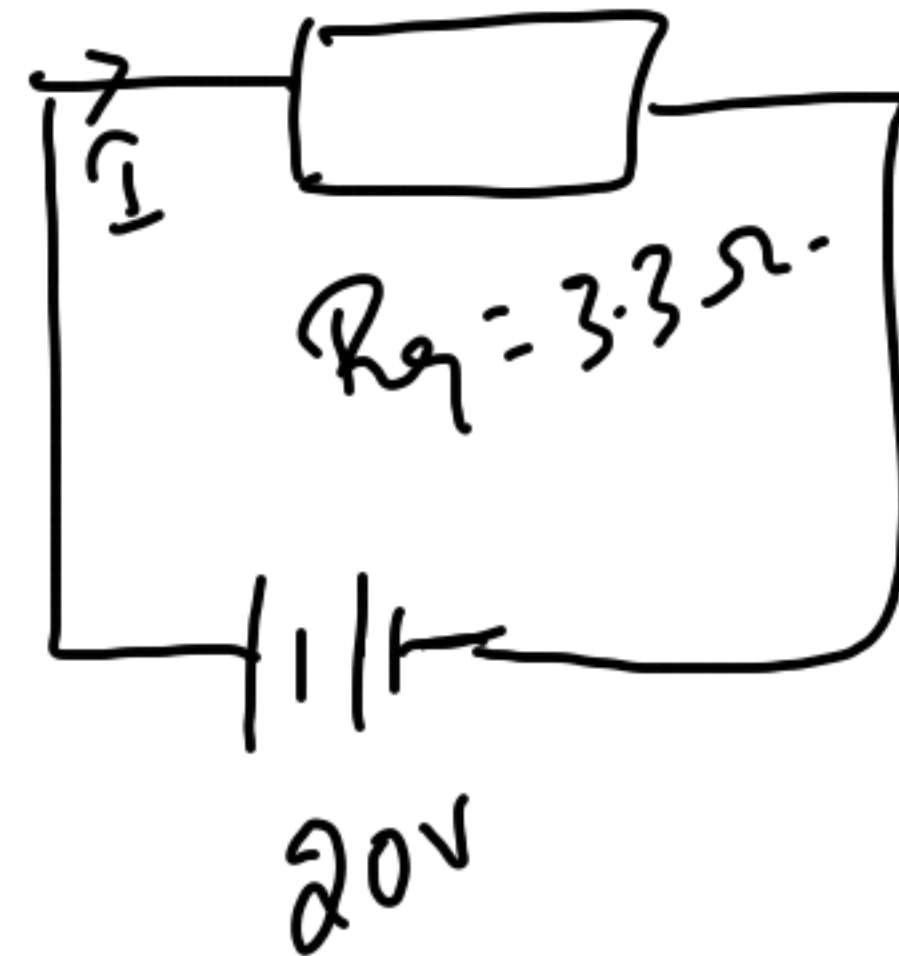


To find equivalent Resistance.

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{5} + \frac{1}{10}$$

$$\frac{1}{R_{eq}} = 0.2 + 0.1 = 0.3$$

$$R_{eq} = \frac{1}{0.3} = 3.3\Omega$$



Apply Ohm's law

$$I = \frac{V}{R} = \frac{20}{3.3}$$

$$I = 6A$$

To find I_1

$$I_1 = \frac{I \cdot \left(\frac{1}{R_1}\right)}{\frac{1}{R_1} + \frac{1}{R_2}}$$

$$I_1 = \frac{6 \left(\frac{1}{5}\right)}{\left(\frac{1}{5} + \frac{1}{10}\right)}$$

$$I_1 = 4A$$

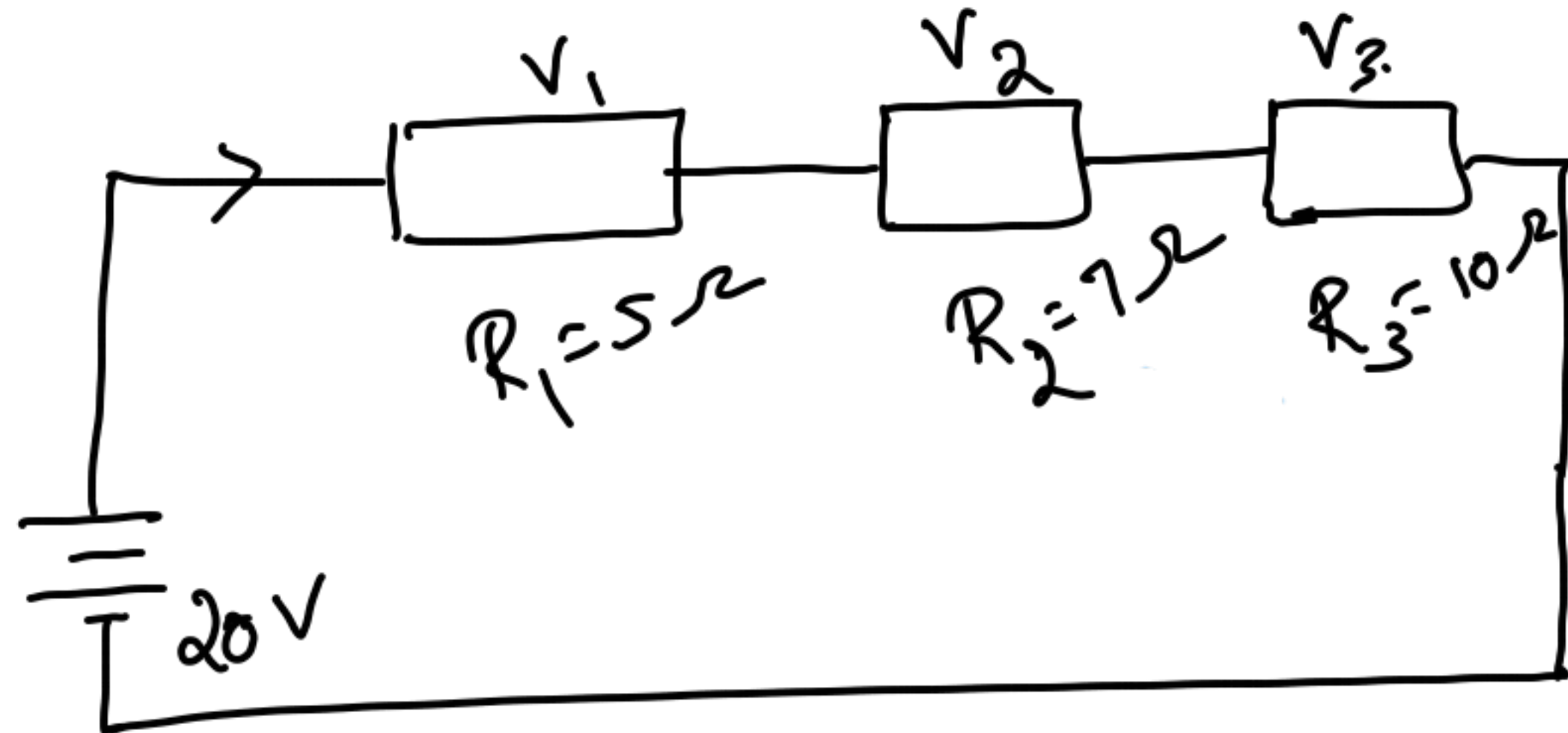
$$(or) I_1 = \frac{I \cdot R_2}{R_1 + R_2}$$

$$I_2 = \frac{I \left(\frac{1}{R_2}\right)}{\frac{1}{R_1} + \frac{1}{R_2}}$$

$$I_2 = \frac{6 \cdot \left(\frac{1}{10}\right)}{\frac{1}{5} + \frac{1}{10}}$$

$$I_2 = 2A$$

2) Calculate the Voltage across each Resistor in the Circuit.



$$V_1 = I R \quad (or) \quad V_1 = \frac{V \cdot R_1}{R_1 + R_2 + R_3}$$

$$V_1 = \frac{20 \times 5}{5 + 7 + 10}$$

$$V_1 = \frac{100}{22} = 4.54V$$

$$V_2 = \frac{V \cdot R_2}{R_1 + R_2}$$

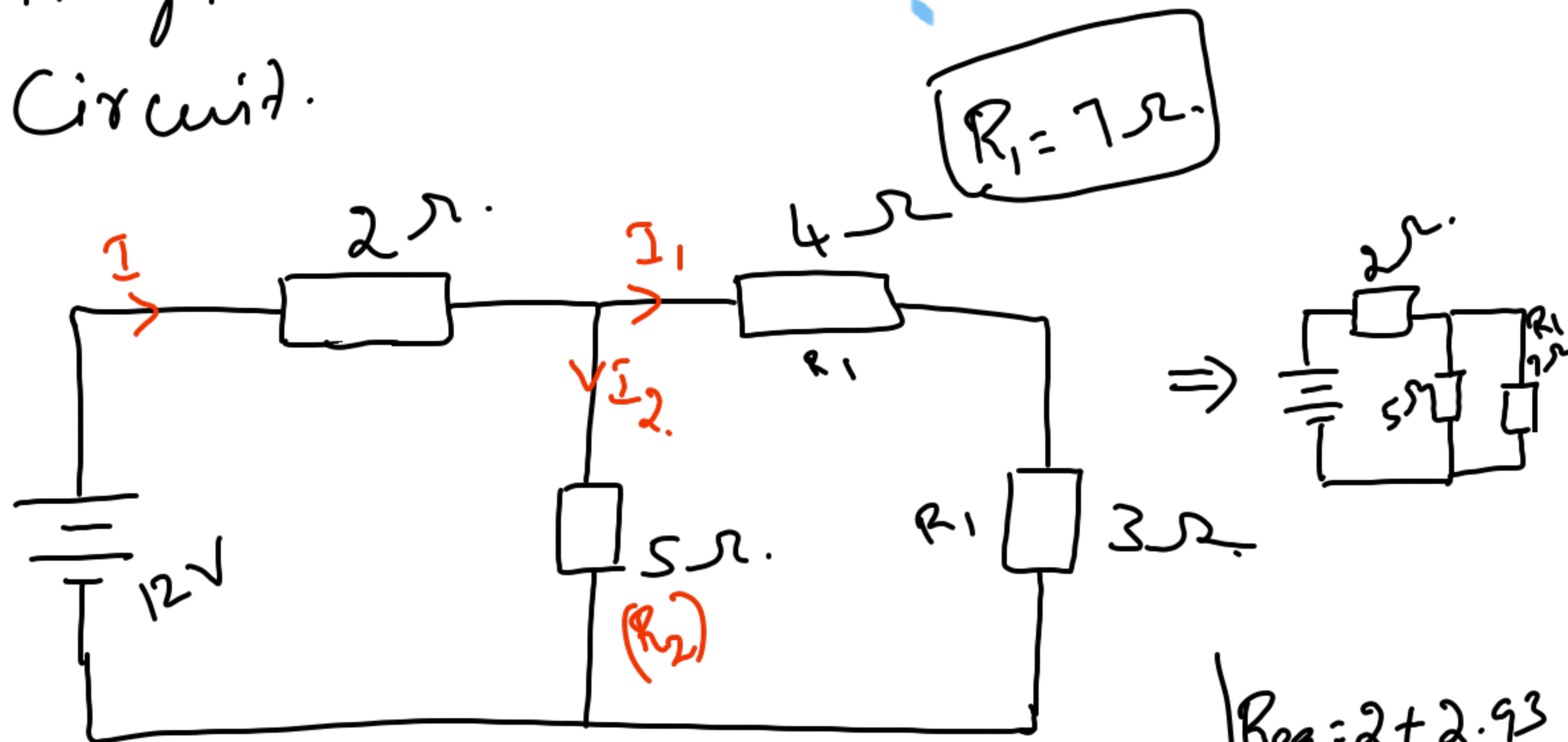
$$V_2 = \frac{20 \times 7}{22}$$

$$V_2 = \frac{140}{22} = 6.36 \text{ V}$$

$$V_3 = \frac{V \cdot R_3}{R_1 + R_2}$$

$$V_3 = \frac{20 \times 10}{22} = \frac{200}{22} = 9.09 \text{ V}$$

3) Calculate the current flowing through each Resistor in the Circuit.



$$R_{eq1} = 4 + 3 = 7 \Omega$$

$$\frac{1}{R_{eq2}} = \frac{1}{5} + \frac{1}{7}$$

$$\frac{1}{R_{eq2}} = 0.341$$

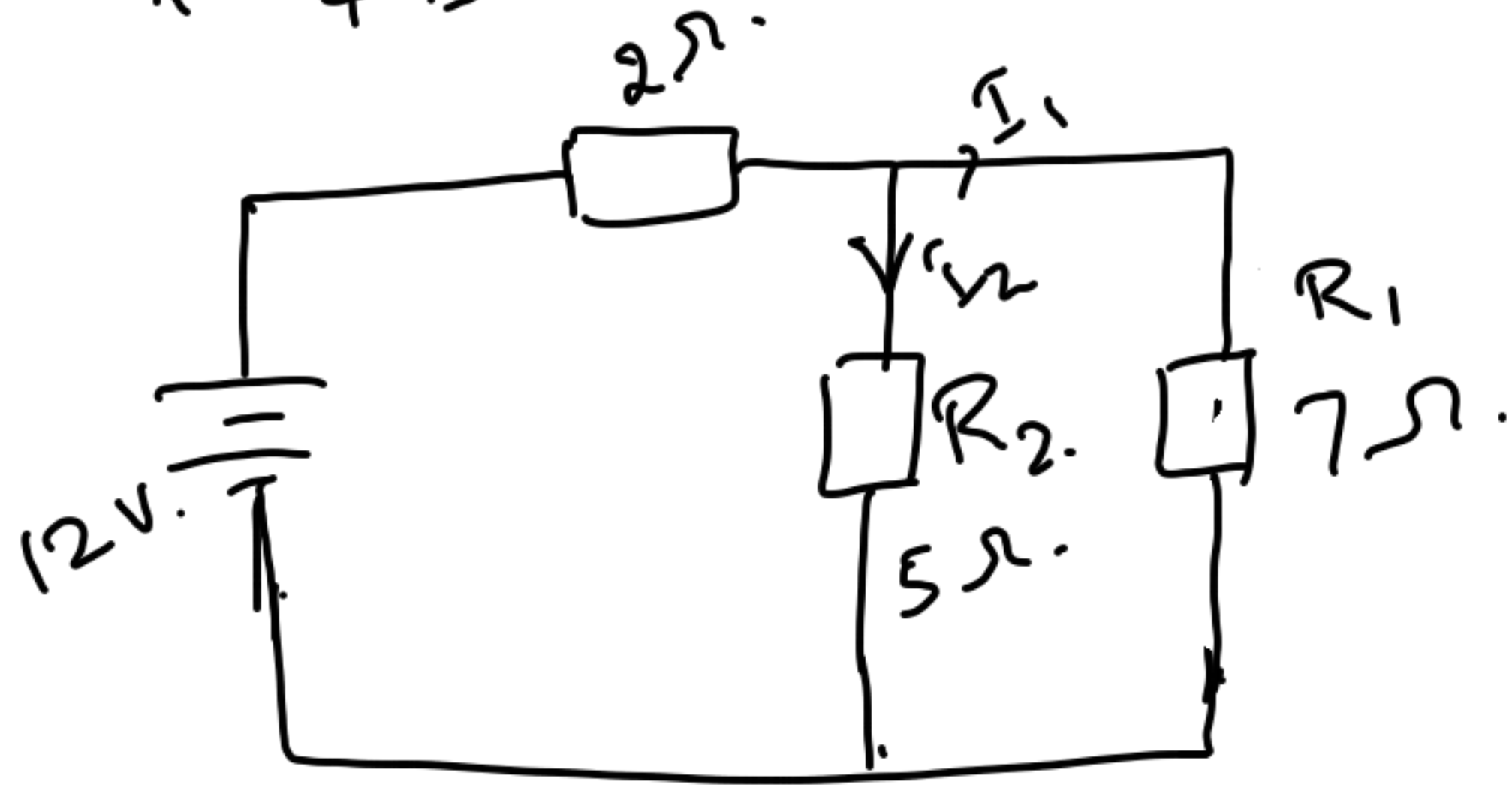
$$R_{eq2} = \frac{1}{0.341}$$

$$R_{eq2} = 2.93 \Omega$$

$$R_{eq} = 2 + 2.93$$

$$R_{eq} = 4.93$$

$$\hat{I} = \frac{V}{R} = \frac{12}{4.93} = 2.43 \text{ A}$$



$$\hat{I}_1 = \frac{\hat{I} \cdot R_2}{R_1 + R_2} = \frac{2.43 \times 5}{5 + 7}$$

$$\hat{I}_1 = 1.013 \text{ A}$$

$$\hat{I}_2 = \frac{\hat{I} \cdot R_1}{R_1 + R_2}$$

$$\hat{I}_2 = \frac{2.43 \times 7}{5 + 7}$$

$$\hat{I}_2 = 1.42 \text{ A}$$

Current across 2Ω = 2.43 A.

" " 5Ω = 1.42 A

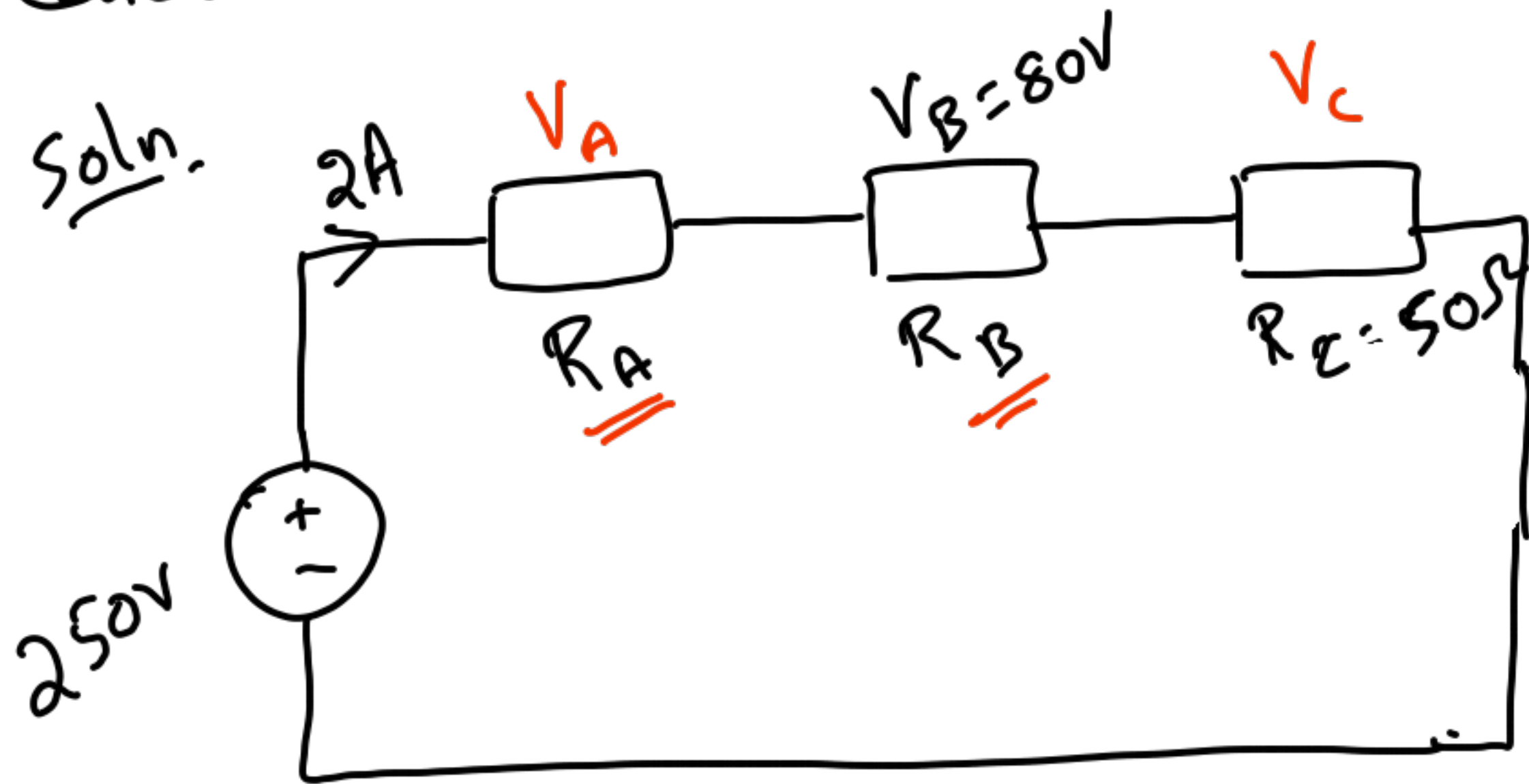
" " 7Ω = 1.013 A
(3Ω 4Ω)

4) Three Resistors are connected in series to a 250V Source.

$R_C = 50\Omega$, $V_B = 80V$. Total current = 2A.

Calculate R_A & R_B

Soln.



To find R_B .

$$R_B = \frac{V_B}{I} = \frac{80}{2} = 40\Omega$$

$$R_T = \frac{V}{I} = \frac{250}{2} = 125\Omega.$$

$$R_T = R_A + R_B + R_C$$

$$125 = R_A + 40 + 50$$

$$R_A = 125 - 90$$

$$R_A = 35\Omega$$

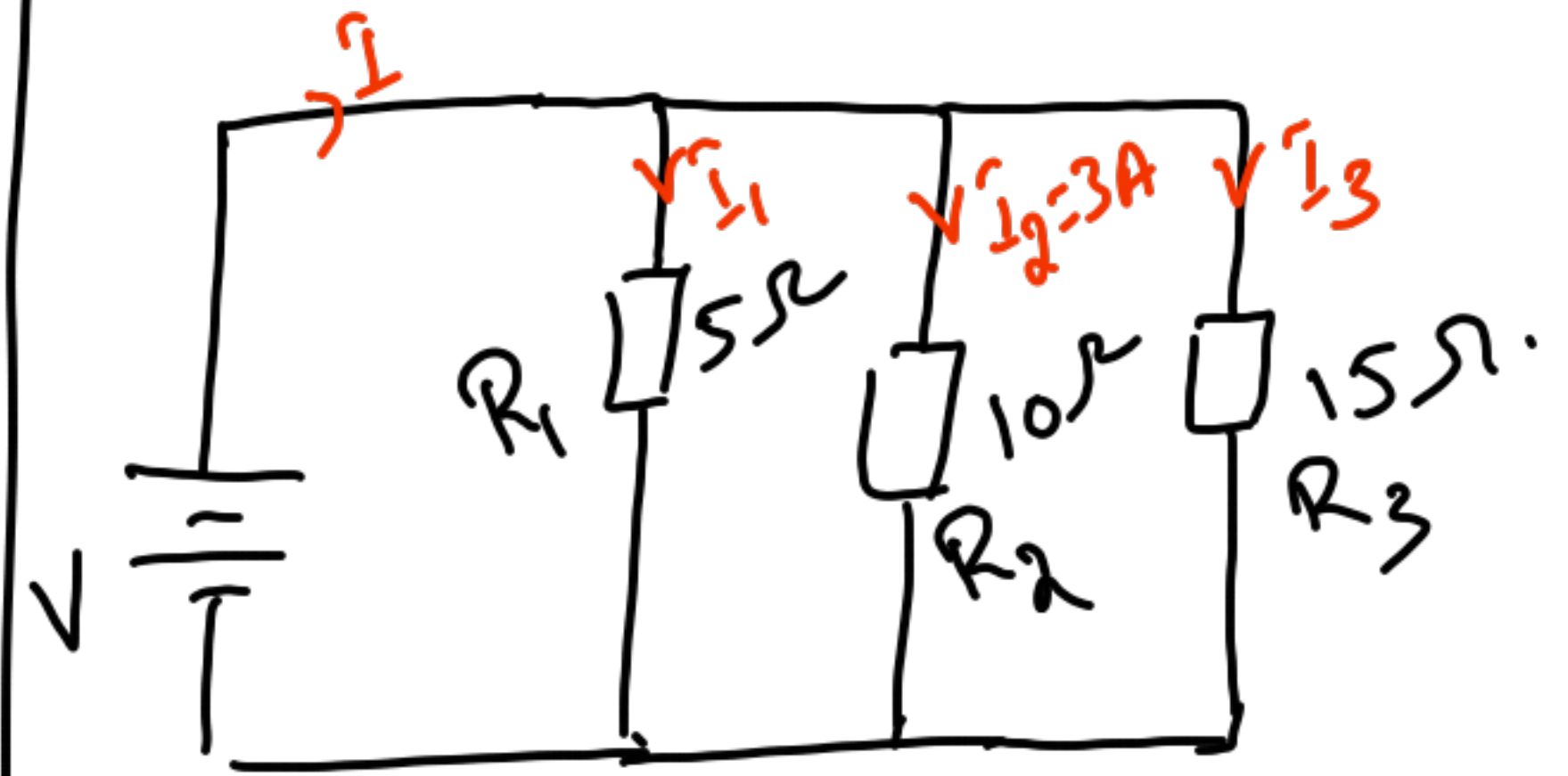
5) Three Resistors 5Ω , 10Ω and 15Ω are connected in parallel. If the current in 10Ω Resistor is $3A$. Calculate the Current in other Resistors, total Current and the Voltage applied to the circuit.

Soln.

$$I_1 \text{ \& \; } I_3 = ?$$

$$I = ?$$

$$V = ?$$



$$V = I_2 R_2 = 3 \times 10 = 30V.$$

$$I_1 = \frac{V}{R_1} = \frac{30}{5} = 6A$$

$$I_3 = \frac{V}{R_3} = \frac{30}{15} = 2A$$

$$\hat{I} = \hat{I}_1 + \hat{I}_2 + \hat{I}_3$$

$$\hat{I} = 6 + 3 + 2 = 11 \text{ A}$$