

Work on:

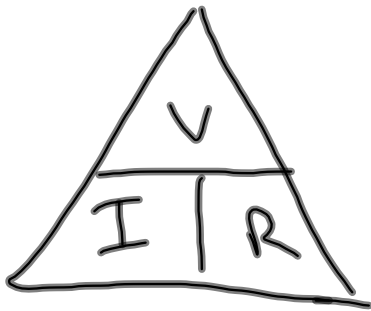
Parallel Worksheet

Review pkg (orange):

#s 1, 2nd + 4th 5,

6's, 7's

10's, 12, 15's



$$V = IR$$

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

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



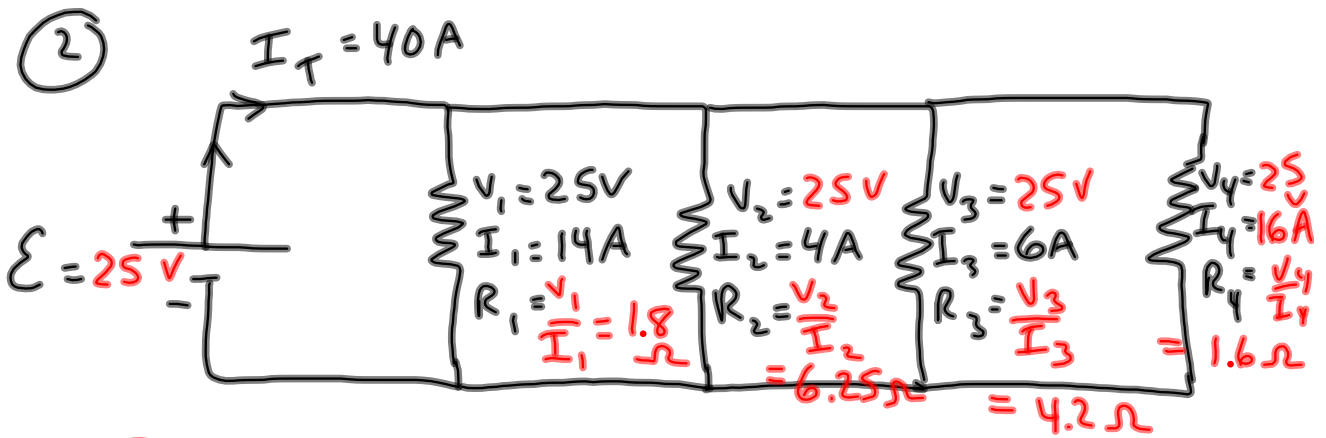
$$\epsilon = I_T R_{eq}$$

OR

$$I_T = \frac{\epsilon}{R_{eq}}$$

OR

$$R_{eq} = \frac{\epsilon}{I_T}$$



$$I_T - I_1 - I_2 - I_3 = 16\text{A} = I_4$$

To Find R_{eq} : 2 ways

$$R_{eq} = \frac{\mathcal{E}}{I_T}$$

$$= \frac{25\text{V}}{40\text{A}}$$

$$R_{eq} = 0.625\ \Omega$$

$$\boxed{x^{-1}}$$

$$\boxed{\frac{1}{x}}$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$$

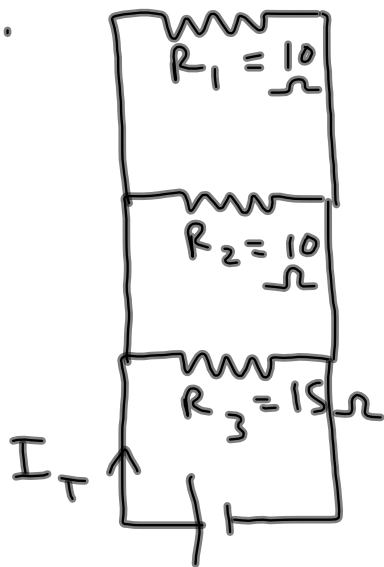
$$\frac{1}{R_{eq}} = \frac{1}{1.8} + \frac{1}{6.25} + \frac{1}{4.2} + \frac{1}{1.6}$$

$$\frac{1}{R_{eq}} = 0.56 + 0.16 + 0.24 + 0.625$$

$$\frac{1}{R_{eq}} = \frac{1.585}{1}$$

$$\frac{R_{eq}}{1} = \frac{1}{1.585} = 0.63\ \Omega$$

3.



$$\mathcal{E} = 60 \text{ V}$$

 $I_T ?$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{10} + \frac{1}{15}$$

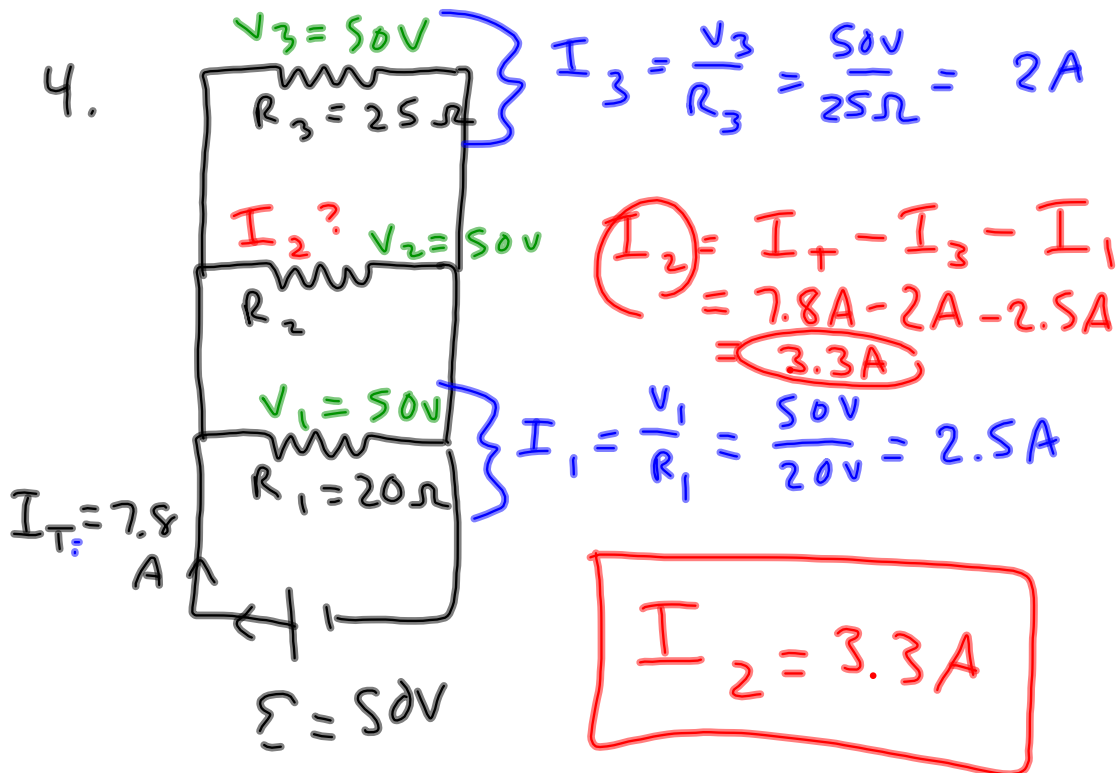
$$\frac{1}{R_{eq}} = 0.1 + 0.1 + 0.067$$

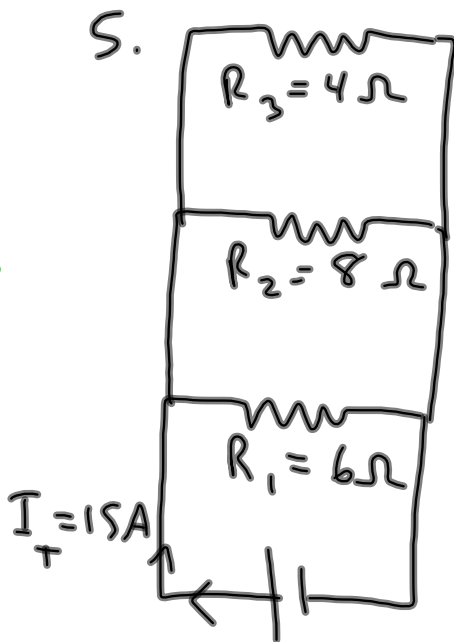
$$\frac{1}{R_{eq}} = 0.267$$

$$R_{eq} = \frac{1}{0.267} = 3.75 \Omega$$

$$I_T = \frac{\mathcal{E}}{R_{eq}}$$

$$= \frac{60 \text{ V}}{3.75 \Omega} = \boxed{16 \text{ A}}$$





$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$\frac{1}{R_{eq}} = \frac{1}{6} + \frac{1}{8} + \frac{1}{4}$$

$$\frac{1}{R_{eq}} = 0.16 + 0.125 + 0.25$$

$$\frac{1}{R_{eq}} = 0.54$$

$$R_{eq} = \frac{1}{0.54} = 1.85\Omega$$

$$\begin{aligned} \mathcal{E} &= I_T R_{eq} \\ &= (15A)(1.85\Omega) = 27.7V \end{aligned}$$

6. R_{eq} ?

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5} + \frac{1}{R_6}$$

$$\frac{1}{5} + \frac{1}{6} + \frac{1}{1} + \frac{1}{3} + \frac{1}{4} + \frac{1}{2}$$

$$\frac{1}{r_{eq}} = 0.2 + 0.166 + 1 + 0.333 + 0.25 + 0.5$$

$$\frac{1}{r_{eq}} = 2.44 \Omega \text{ Flip!}$$

$$\frac{r_{eq}}{1} = \frac{1}{2.449 \Omega}$$

$$r_{eq} = 0.40832 \Omega$$

$$I = \frac{E}{r_{eq}}$$

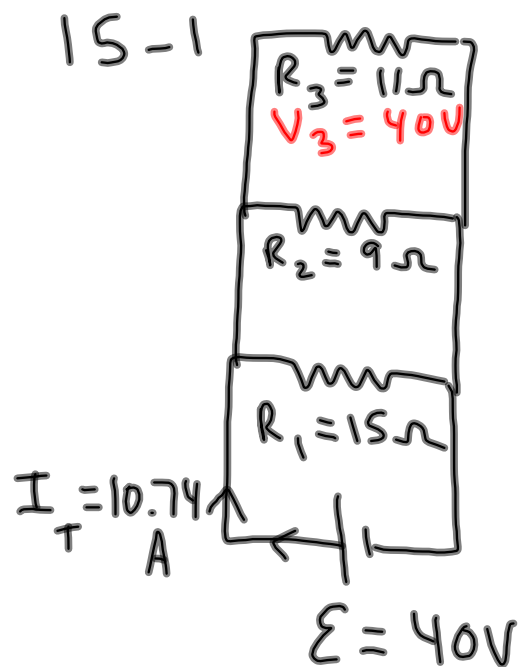
$$E = I + r_{eq}$$

$$E (20A) (0.40832 \Omega)$$

$$E = 8.1664V$$

$$E \approx 8.2V$$

Orange Review Booklet

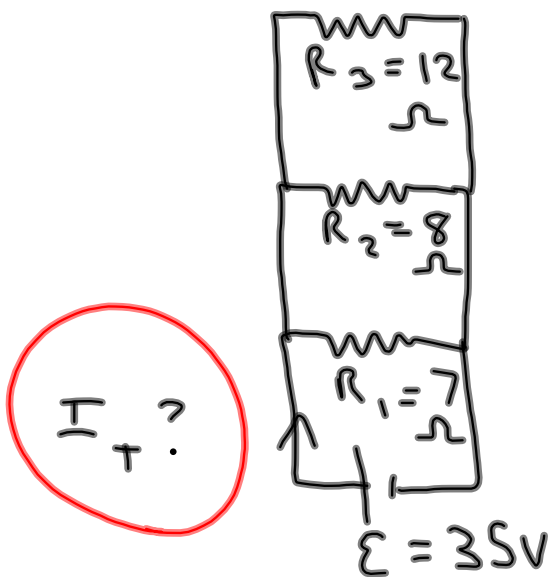


I_3 ?

$$I_3 = \frac{V_3}{R_3} = \frac{40V}{11\Omega}$$

$$I_3 = 3.64 A$$

15-2

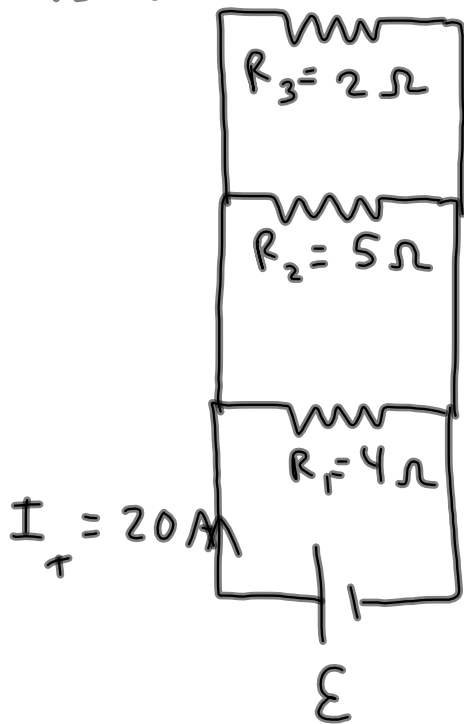


$$\frac{1}{R_{eq}} = \frac{1}{7} + \frac{1}{8} + \frac{1}{12}$$

$$R_{eq} = 2.85 \Omega$$

$$I_T = \frac{\mathcal{E}}{R_{eq}} = 12.28\text{A}$$

15-3



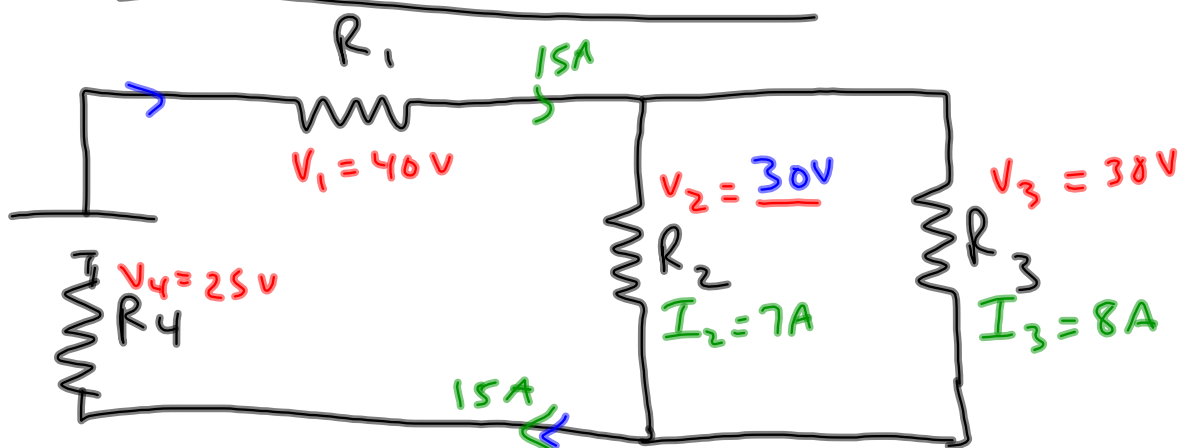
$$\mathcal{E} = ?$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$R_{eq} = 1.05 \Omega$$

$$\mathcal{E} = I_T R_{eq} = 21 \text{ V}$$

Combination Circuit Problems



$$V_1 = 40V$$

$$V_2 = ? = 30V$$

$$V_3 = 30V$$

$$V_4 = 25V$$

$$I_1 = ? 15A$$

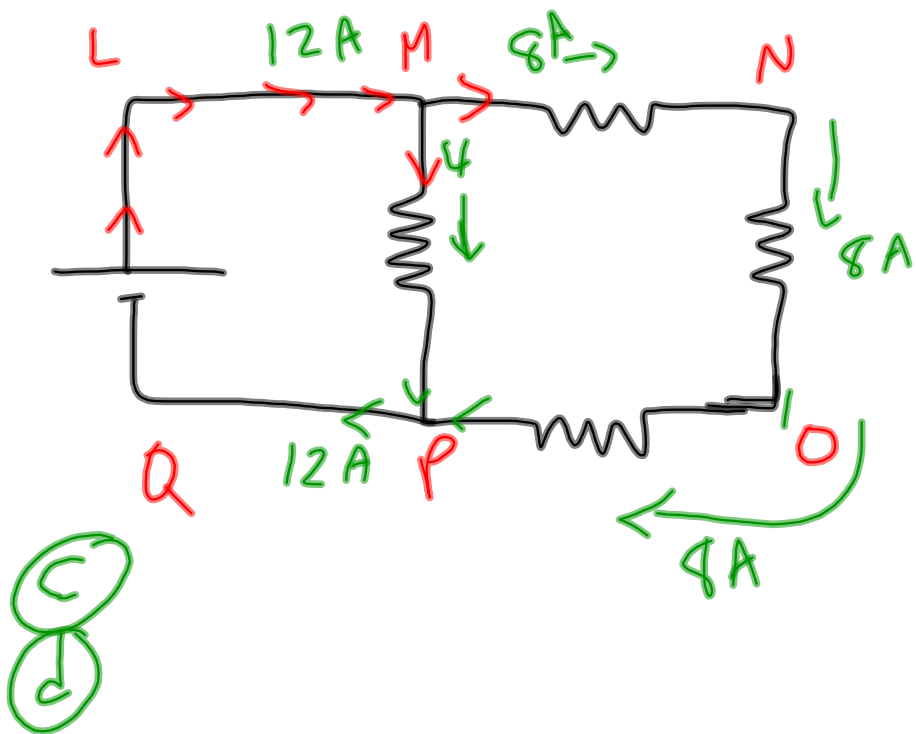
$$I_2 = 7A$$

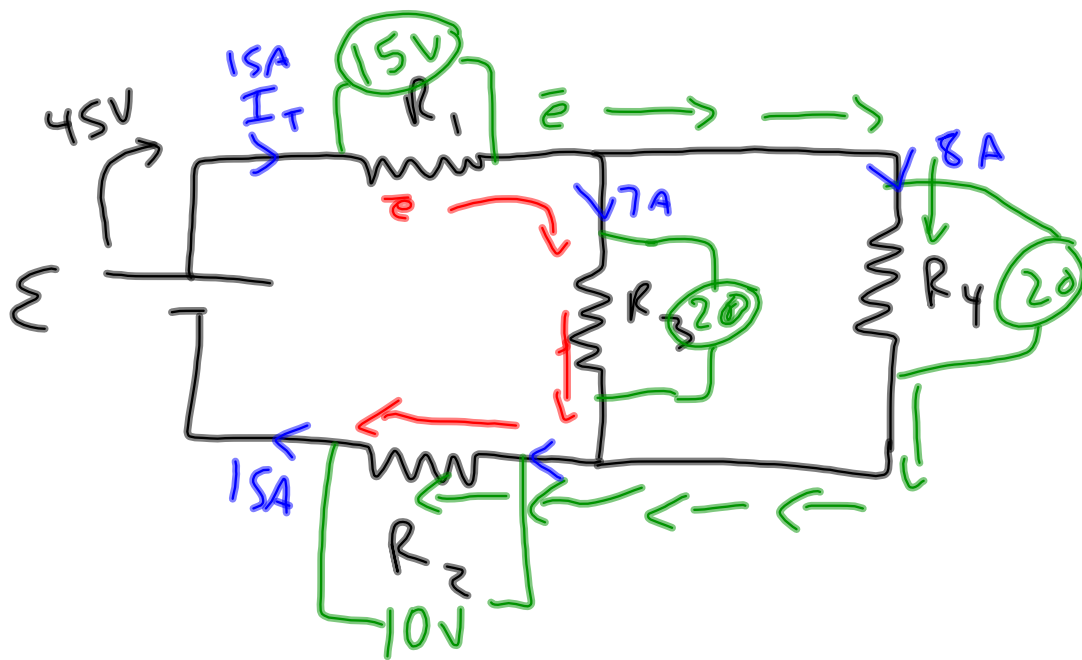
$$I_3 = 8A$$

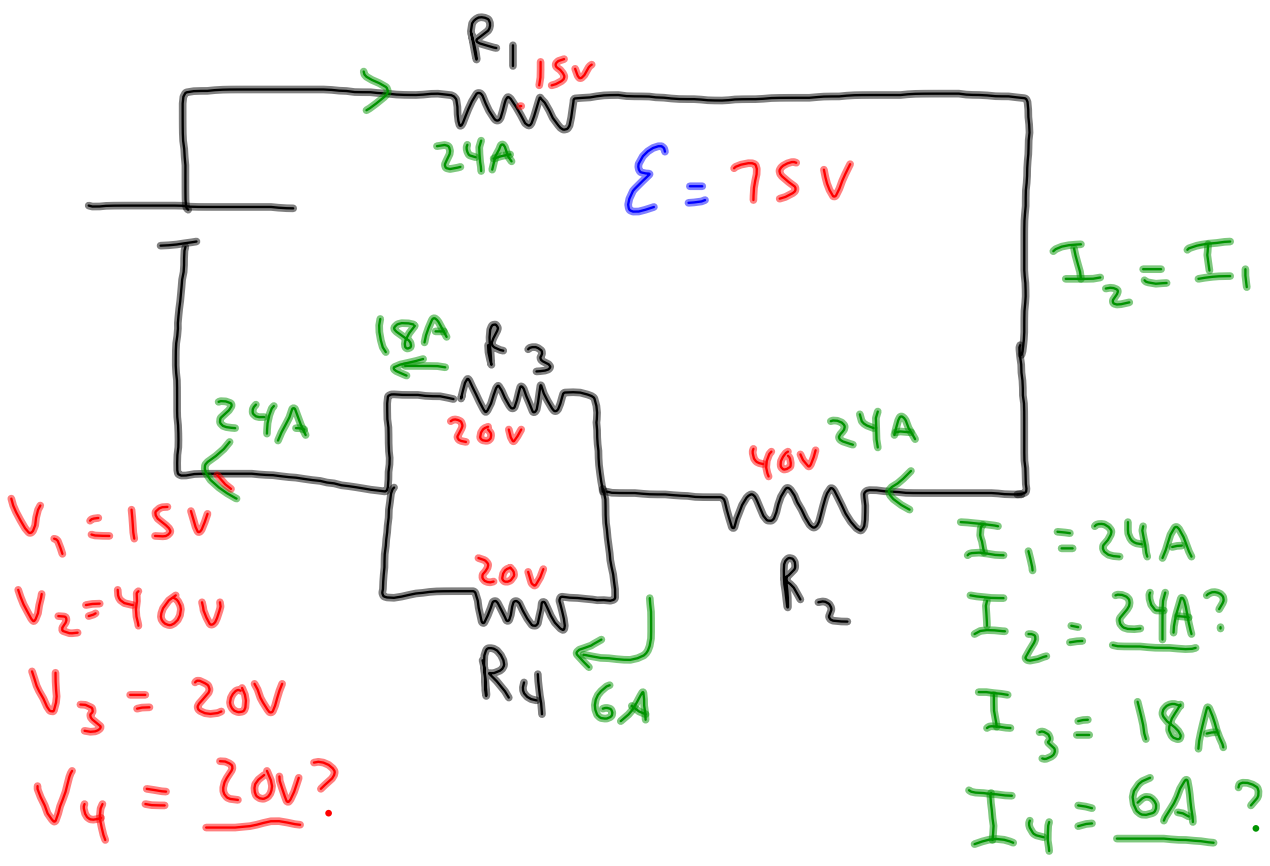
$$I_4 = ? 15A$$

Since $R_2 + R_3$
are in parallel
they must have
same voltage

$$I_1 = I_4 = I_2 + I_3$$

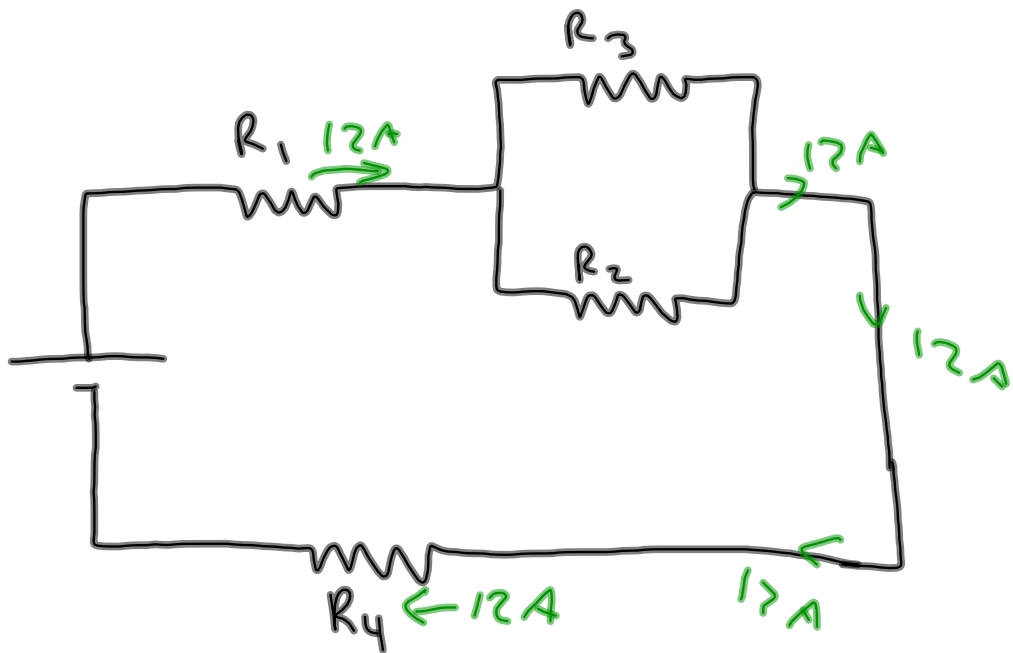






$V_1 = 15\text{V}$
 $V_2 = 40\text{V}$
 $V_3 = 20\text{V}$
 $V_4 = \underline{20\text{V}}?$

$I_1 = 24\text{A}$
 $I_2 = \underline{24\text{A}}?$
 $I_3 = 18\text{A}$
 $I_4 = \underline{6\text{A}}?$



$$V_3 = 32\text{V}$$

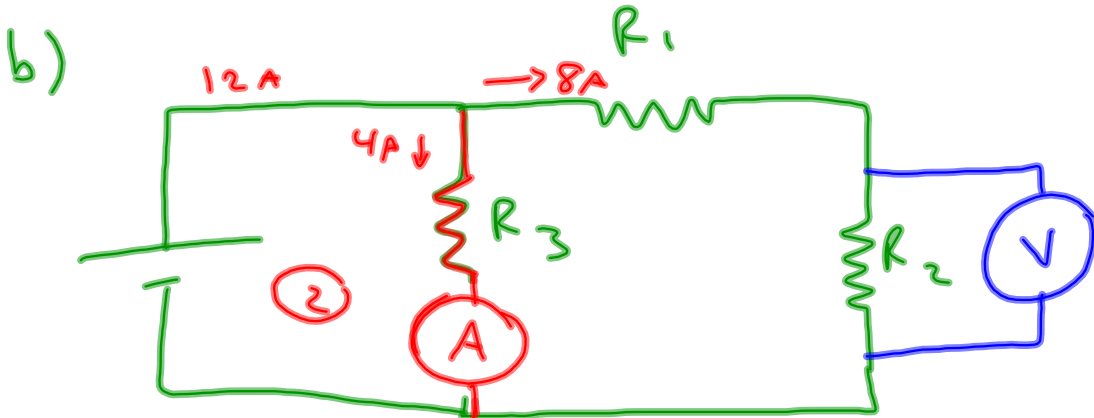
because $R_2 + R_3$ are in parallel

$$V_2 = V_3$$

$$I_4 = 12\text{A}$$

$$I_4 = I_1$$

4. a) ^① ammeter



c) In series

Explain The current has to flow through it to be measured.

d) How would you connect a voltmeter to measure the potential difference across R_2 ?

Connected in parallel.

Reason: Electrons do not need to flow through it for their energy difference to be calculated.