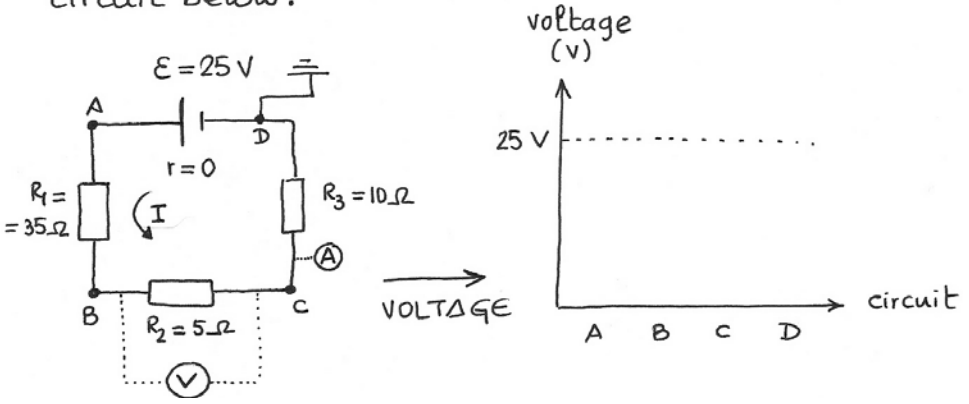
Conceptual Exercise

Complete the graphics related to the electric circuit below:



Determination of potentials (voltages)

"D" point is connected to the ground. Therefore, $V_D = 0$ V

"A" point is next to the postive electrode of the battery. It means that $V_A = 25$ V

The potential difference between "A" and "B" (the voltage "lost") is:

$$V_A - V_B = I * R = I * 35\ \Omega$$

To get the value, we need the value of the current. That can be found applying Ohm's law:

$$I = \frac{\varepsilon}{R_{equiv}} = \frac{25\ V}{35\ \Omega + 5\ \Omega + 10\ \Omega} = 0.5\ A$$

The potential (voltage) difference between "A" and "B" is:

$$V_A - V_B = I * R = 0.5\ A * 35\ \Omega = 17.5\ V$$

The potential (voltage) at "B" is:

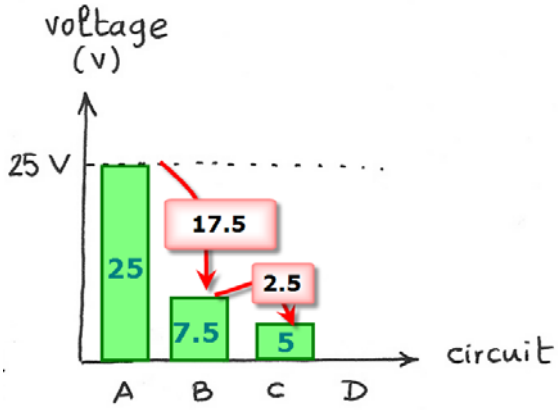
$$V_A - V_B = 17.5\ V \xrightarrow{V_A = 25\ V} 25\ V - V_B = 17.5\ V \rightarrow V_B = 7.5\ V$$

The potential difference between "B" and "C" is:

$$V_B - V_C = I * R = 0.5\ A * 5\ \Omega = 2.5\ V$$

The potential (voltage) at "C" is:

$$V_B - V_C = 2.5\ V \xrightarrow{V_B = 7.5\ V} 7.5\ V - V_C = 2.5\ V \rightarrow V_C = 5\ V$$



Determination of powers

The electric power (energy per second) supplied by the battery is:

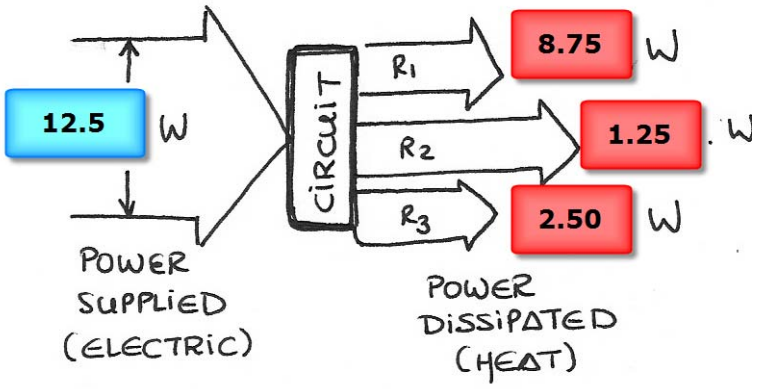
$P_{supplied} = \varepsilon * I = 25\ V * 0.5\ A = 12.5\ W$

The power dissipated (as heat) by each resistor is:

$P_{R1} = I^2 * R = (0.5\ A)^2 * 35\ \Omega = 8.75\ W$

$P_{R2} = I^2 * R = (0.5\ A)^2 * 5\ \Omega = 1.25\ W$

$P_{R3} = I^2 * R = (0.5\ A)^2 * 10\ \Omega = 2.50\ W$



Determination of the readings

The reading of the ammeter gives the value of the current. The reading of the voltmeter gives the value of the potential difference between two points: