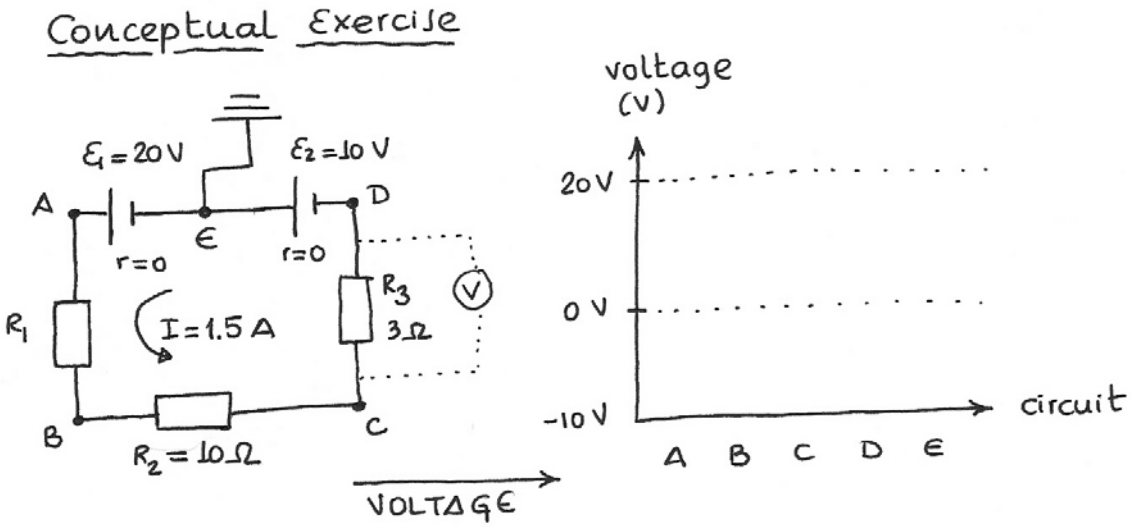


Determination of potentials (voltages)

"E" point is connected to the ground. Therefore, $V_E = 0$ V

"A" point is next to the postive electrode of the battery. It means that $V_A = 20$ V

From Ohm's Law, we can get the value of R_1:

$$I = \frac{\mathcal{E}}{R_{equiv}} = \frac{30\ V}{R_1 + 10\ \Omega + 3\ \Omega} = 1.5\ A \rightarrow R_1 = 7\ \Omega$$

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

$$V_A - V_B = I * R = 1.5\ A * 7\ \Omega = 10.5\ V$$

The potential (voltage) at "B" is:

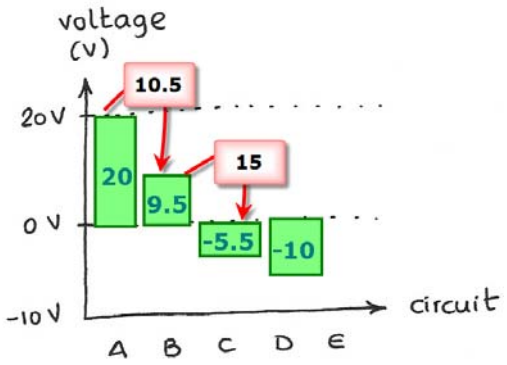
$$V_A - V_B = 10.5\ V \xrightarrow{V_A = 20\ V} 20\ V - V_B = 10.5\ V \rightarrow V_B = 9.5\ V$$

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

$$V_B - V_C = I * R = 1.5\ A * 10\ \Omega = 15\ V$$

The potential (voltage) at "C" is:

$$V_B - V_C = 15\ V \xrightarrow{V_B = 9.5\ V} 9.5\ V - V_C = 15\ V \rightarrow V_C = -5.5\ V$$



Determination of powers

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

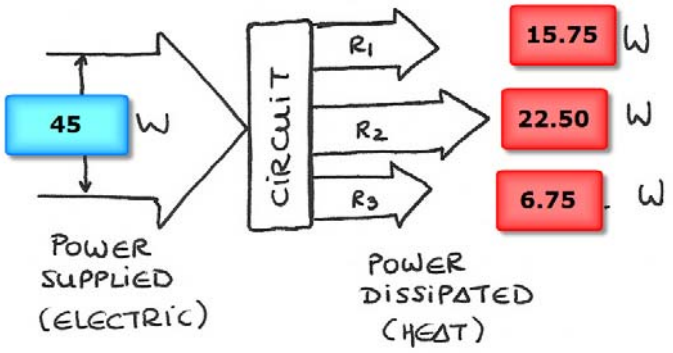
$P_{supplied} = \varepsilon * I = 30\ V * 1.5\ A = 45\ W$

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

$P_{R1} = I^2 * R = (1.5\ A)^2 * 7\ \Omega = 15.75\ W$

$P_{R2} = I^2 * R = (1.5\ A)^2 * 10\ \Omega = 22.50\ W$

$P_{R3} = I^2 * R = (1.5\ A)^2 * 3\ \Omega = 6.75\ W$



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: