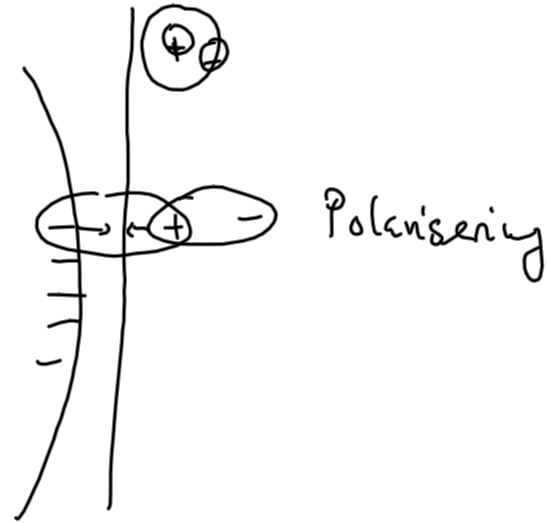
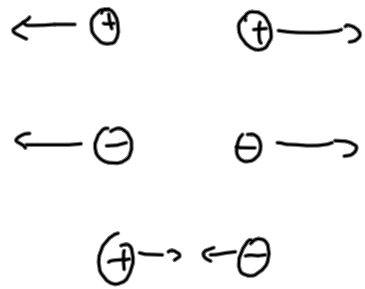
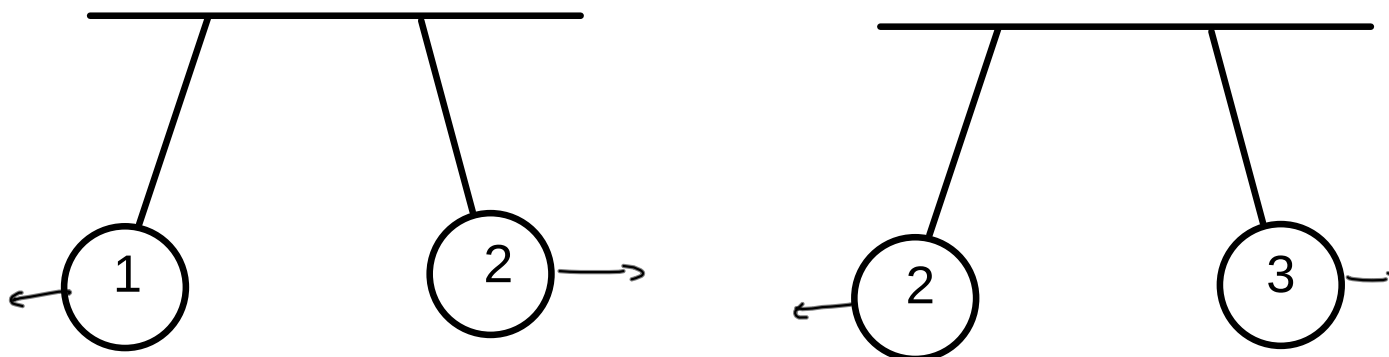


Kapittel 17: Elektrisitet

Statisk elektrisitet



Samsnakk



1: 1 og 3 har samme ladning

2: 1 og 3 har motsatt ladning

3: Alle tre har samme ladning

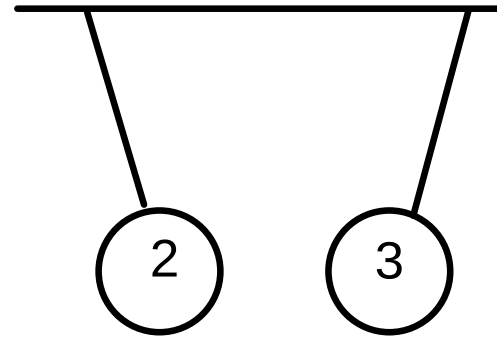
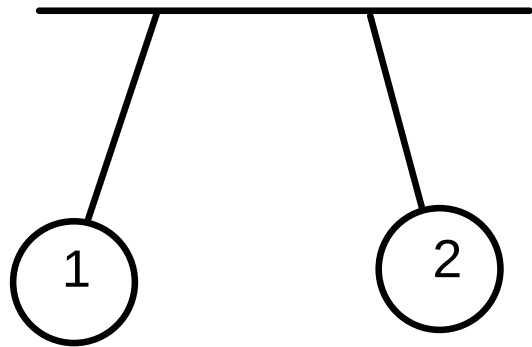
4: En kule har ingen ladning

5: Vi kan ikke avgjøre uten flere

eksperimenter



Samsnakk



1: 1 og 3 har samme ladning

2: 1 og 3 har motsatt ladning

3: Alle tre har samme ladning

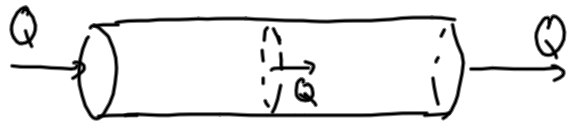
4: En kule har ingen ladning

5: Vi kan ikke avgjøre uten flere



eksperimenter

Elektrisk strøm



$$\text{strøm} = \frac{\text{ladning}}{\text{tid}}$$

$$I = \frac{Q}{t}$$

Enheter:

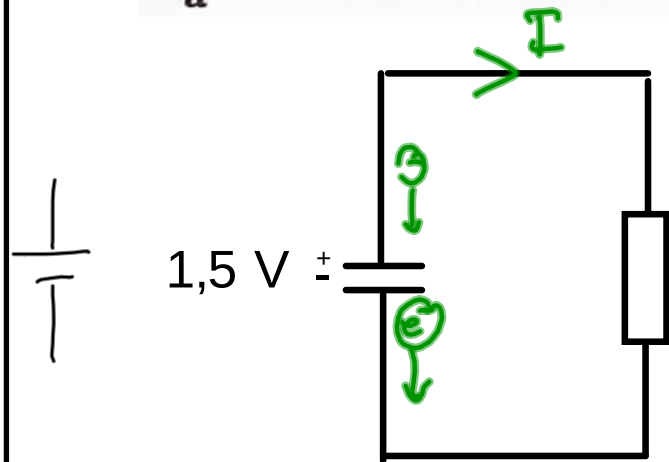
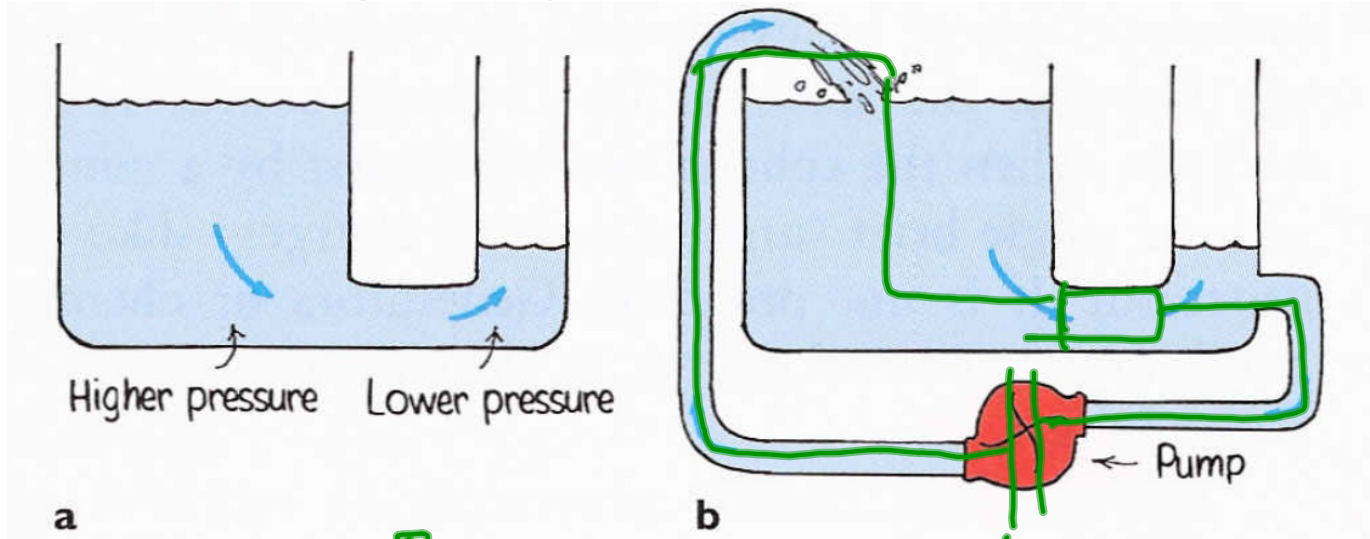
Ladning: Coulomb, C

$$e^- : e = -1,6 \cdot 10^{-19} \text{ C}$$

Strøm: Ampere, A

$$A = \frac{C}{s}$$

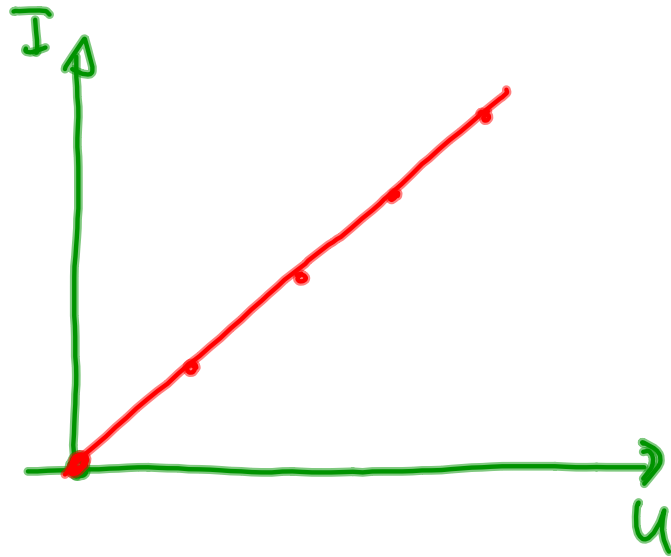
Elektrisk spenning



Spenning = $\frac{\text{Arbeid}}{\text{ladning}}$

Volt : $V = \frac{J}{C}$

Resistans og Ohms lov



$$I = \frac{1}{R} U$$

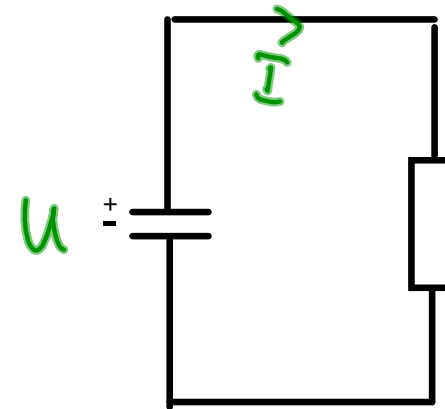
$$U = RI$$

Ohms lov

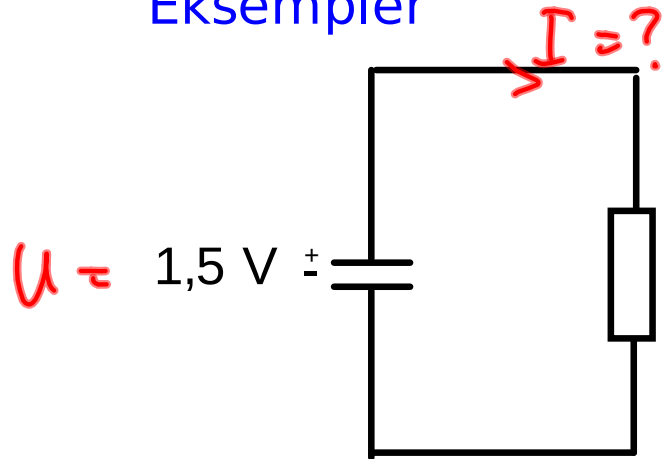
↳ Resistans, modstand

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

$$\Omega = \frac{V}{A}$$



Eksempler

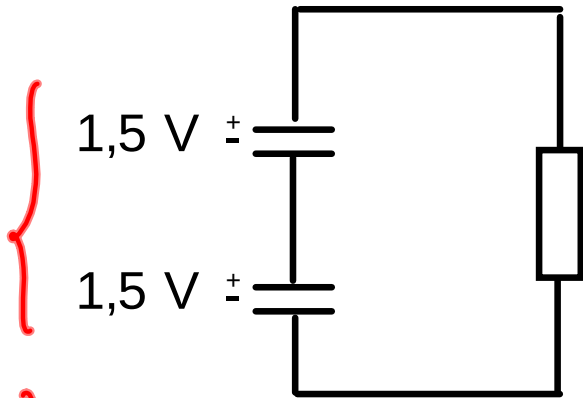


$$U = 1,5 \text{ V}$$

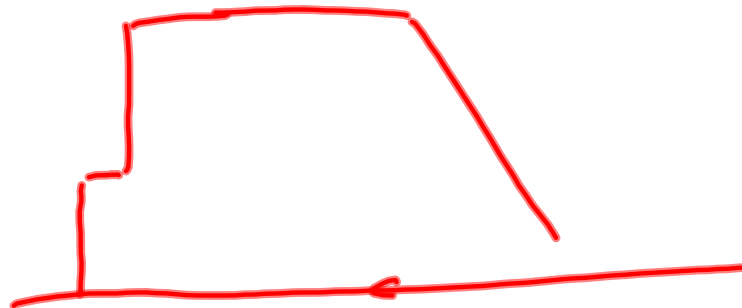
$$3,0 \Omega$$

$$U = R I$$

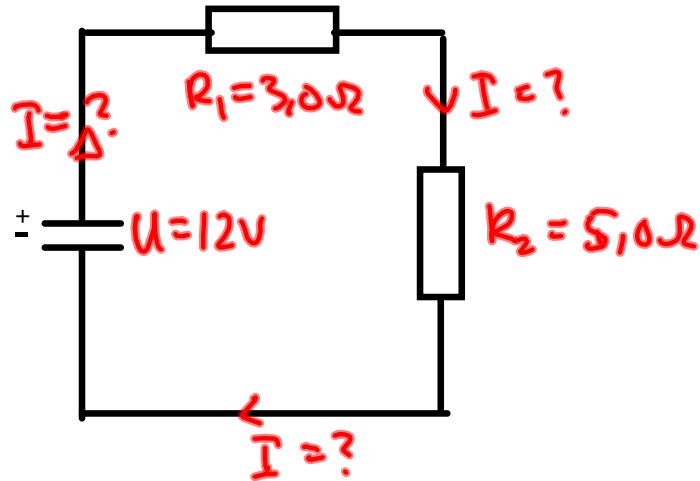
$$I = \frac{U}{R} = \frac{1,5 \text{ V}}{3,0 \Omega} = 0,50 \text{ A}$$



$$U = 3,0 \text{ V}$$



Seriakobling



$$U_1 = R_1 \bar{I}$$

$$U_2 = R_2 \bar{I}$$



$$U = U_1 + U_2$$

$$= R_1 \bar{I} + R_2 \bar{I}$$

$$= \underbrace{(R_1 + R_2)}_{R_T} \bar{I} = R_T \bar{I}$$

$$R_T = R_1 + R_2$$

$$R_T = 3,0\Omega + 5,0\Omega = 8,0\Omega$$

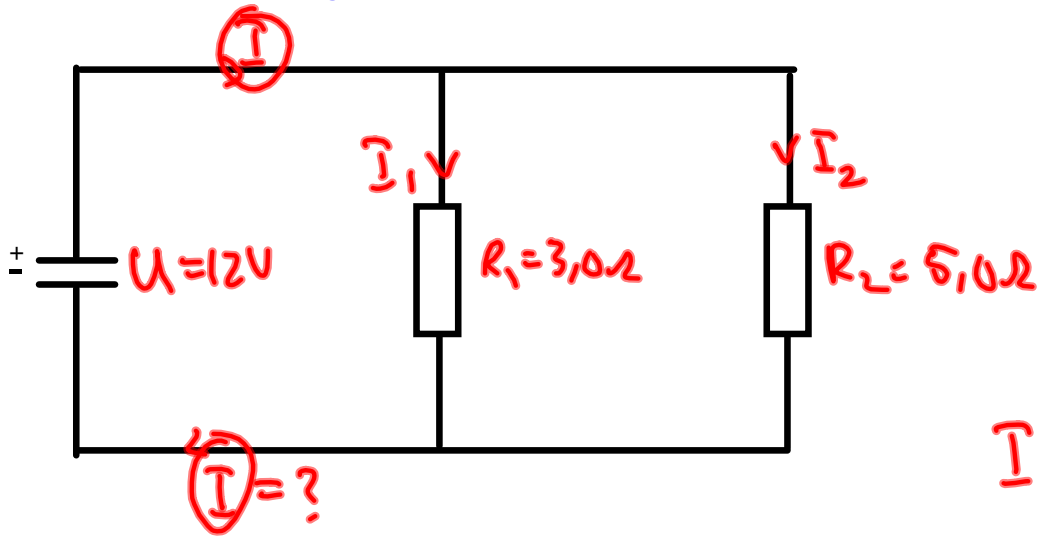
$$\bar{I} = \frac{U}{R_T} = \frac{12V}{8,0\Omega} = 1,5A$$

$$U_1 = R_1 \bar{I} = 3,0\Omega \cdot 1,5A = 4,5V$$

$$U_2 = R_2 \bar{I} = 5,0\Omega \cdot 1,5A = 7,5V$$

$$U_1 + U_2 = 12V$$

Parallellkobling



$$U_1 = U_2 = U$$

$$U = U_1 = R_1 I_1$$

$$U = U_2 = R_2 I_2$$

$$I_1 = \frac{U_1}{R_1} = \frac{U}{R_1} = \frac{12V}{3,0\Omega} = 4,0A$$

$$I_2 = \frac{U}{R_2} = \frac{12V}{5,0\Omega} = 2,4A$$

$$I = I_1 + I_2 = 6,4A$$

$$I = I_1 + I_2 = \frac{U}{R_1} + \frac{U}{R_2} = \left(\frac{1}{R_1} + \frac{1}{R_2} \right) U$$

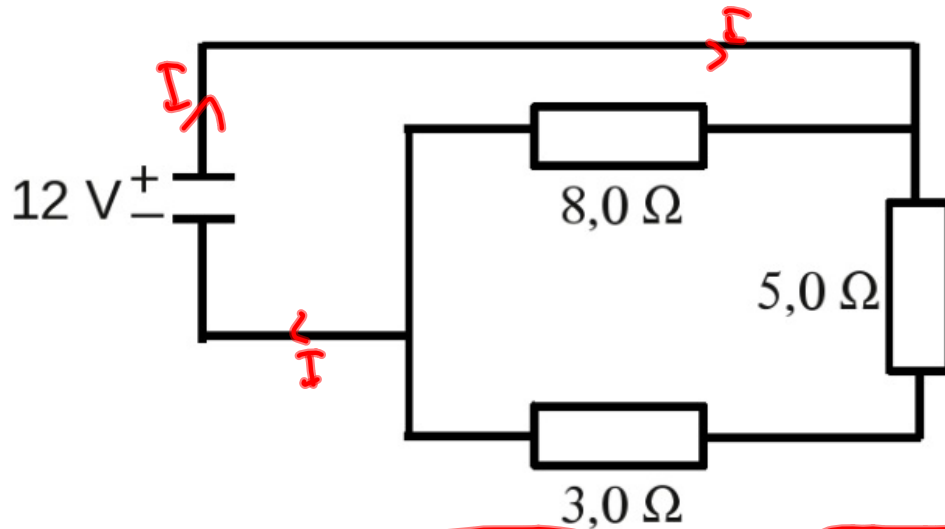
$$I = \frac{1}{R_T} U$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_T} = \frac{1}{3,0\Omega} + \frac{1}{5,0\Omega} = 0,5333 \frac{1}{\Omega}$$

$$R_T = \frac{1}{0,5333 \frac{1}{\Omega}} = \dots \Omega$$

Samsnakk



Hva er strømmen gjennom batteriet?

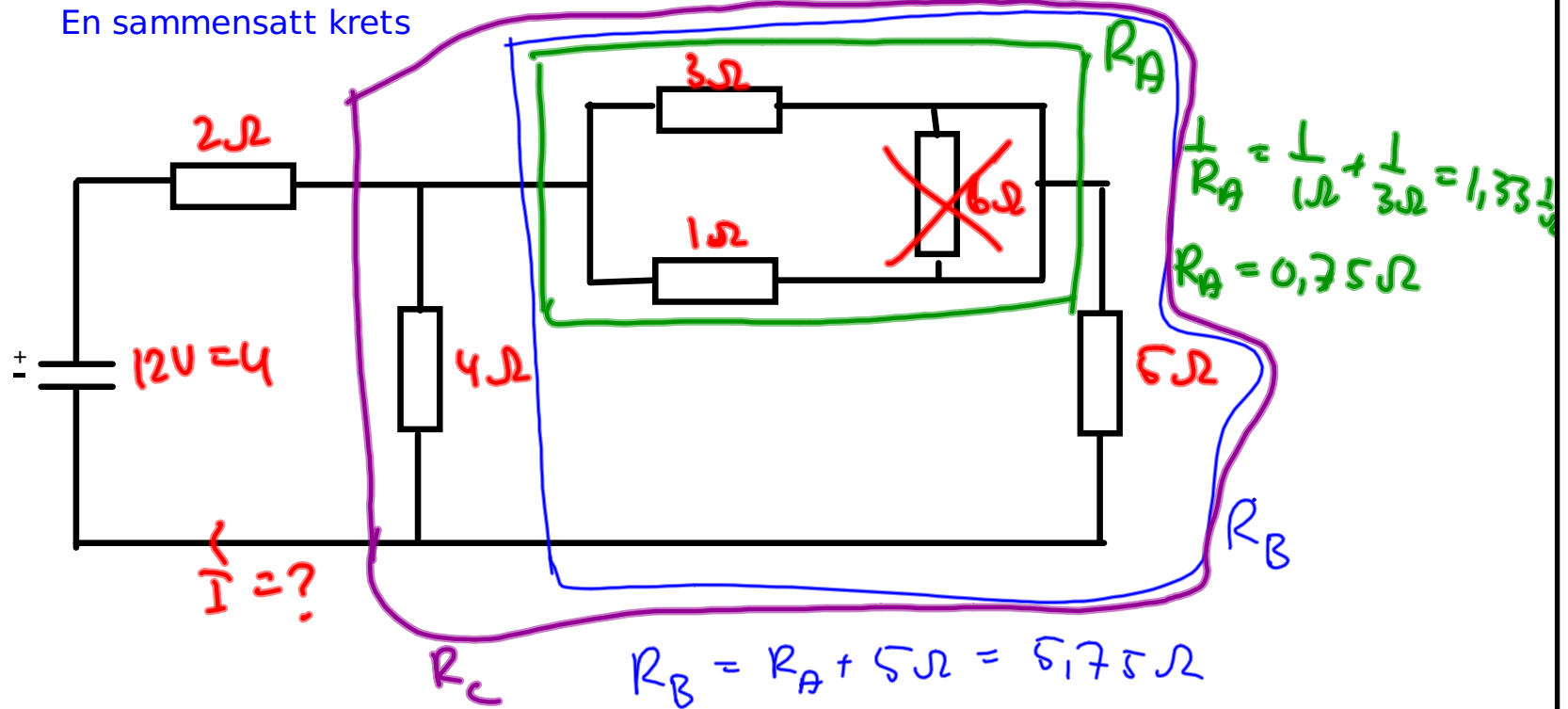


$$\frac{1}{R_T} = \frac{1}{8,0\Omega} + \frac{1}{8,0\Omega}$$
$$= 0,25 \frac{1}{\Omega}$$

$$R_T = 4,0\Omega$$

$$U = R_T I \quad I = \frac{U}{R_T} = \frac{12V}{4,0\Omega}$$
$$= 3,0A$$

En sammensatt krets



$$R_D = 2\Omega + R_C = 4,36\Omega$$

$$I = \frac{U}{R_D} = \frac{12V}{4,36\Omega} = 2,75A$$