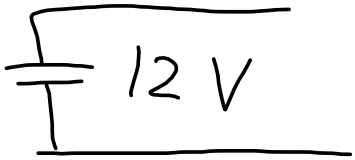
11.306



$$0{,}22\,\text{MC} = 0{,}22 \cdot 10^6\,[\text{C}]$$

$$I = \frac{Q}{t} = \frac{0{,}22 \cdot 10^6\,[\text{C}]}{t}$$

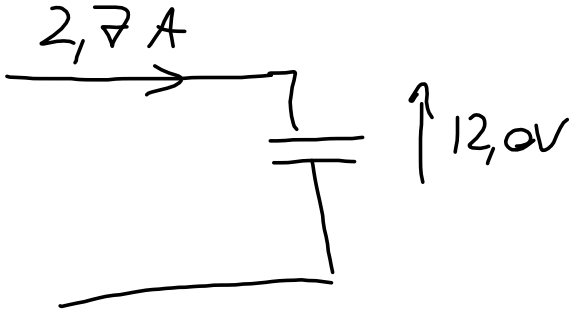
$$I \cdot t = 0{,}22 \cdot 10^6\,[\text{C}]$$

$$E = P \cdot t = U \cdot I \cdot t = 12 \cdot 0{,}22 \cdot 10^6\,[\text{V} \cdot \text{A} \cdot \text{s}]$$

$12\,[\text{V}]$ $0{,}22 \cdot 10^6\,[\text{C}] = 0{,}22 \cdot 10^6\,[\text{A s}]$ $= 2{,}64 \cdot 10^6\,[\text{J}]$

11.310

$t = 4\,h$



$$I = \frac{Q}{t} \Rightarrow Q = I \cdot t = 2{,}7\,[A] \cdot 4 \cdot 3600\,[s]$$

$$Q = 38800\,[As] = 38880\,[C]$$

11.312

$$I_1 - I_2 - I_x = 0$$

$$I_x = I_1 - I_2 = 5 - 2 = 3\,A$$

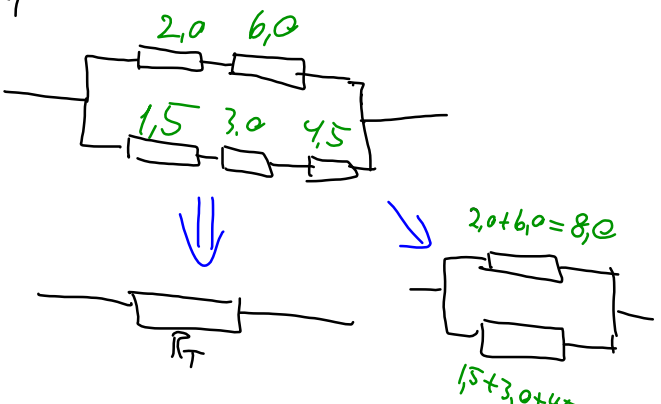
$$I_1 + I_2 + I_3 + I_4 + I_x = 0$$

$$1 + 2 + 3 + 4 + I_x = 0$$

10

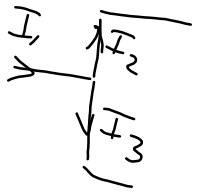
$$I_x = -10\,A$$

11.321



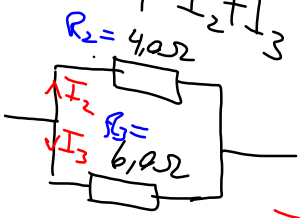
$$R_T = \frac{8,0 \cdot 9,0}{8,0+9,0} = \frac{72}{17,0} = 4,2\,\Omega$$

11.324



$$I_1 - I_2 - I_3 = 0$$

$$I_1 = I_2 + I_3$$



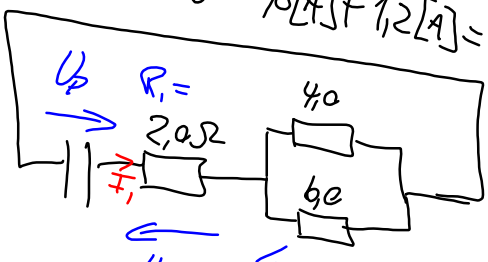
$I_3 = 1,2\,A$

$U_{23} = 7,2\,[V]$ $U_{23} = R_3 I_3$

$-6,0 \cdot 1,2 = 7,2\,[V]$

$$I_2 = \frac{U_{23}}{R_2} = \frac{7,2\,[V]}{4,0\,[\Omega]} = 1,8\,[A]$$

$I_1 = I_2 + I_3 = 1,8[A] + 1,2[A] = 3,0[A]$

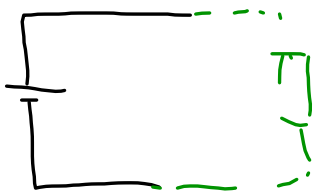


$U_{23} = 7,2\,V$

$U_1 = I_1 \cdot R_1 = 3,0[A] \cdot 2,0[\Omega] = 6,0\,[V]$

$U_p = U_1 + U_{23} = 6,0 + 7,2 = 13,2\,[V]$

11.340



170 mAh

U = 1,5 V

Ett år: $t = 365 \cdot 24 \cdot 60 \cdot 60$ s $= 31{,}536 \cdot 10^6$ s

$I \cdot t = 170\,mAh = 170 \cdot 10^{-3}\,A \cdot 3600\,s = 612\,As$

U = 1,5 V

$P = U \cdot I \quad E = U \cdot I \cdot t$

↑ +/- unøyaktighet

$I \cdot t = 612\,As$

Tar unøyaktighet ↓

$I = \frac{612\,As}{31{,}536 \cdot 10^6\,s} = 1{,}94 \cdot 10^{-5}\,A$

$P = 1{,}5\,V \cdot 1{,}94 \cdot 10^{-5}\,A = 2{,}91 \cdot 10^{-5}\,W$

$P = \frac{E}{t} = \frac{E}{24 \cdot 3600\,[s]} = 2{,}91 \cdot 10^{-5}\,[W]$

↑ ett døgn

$E = 24 \cdot 3600 \cdot 2{,}91 \cdot 10^{-5}\,[Ws] = 2{,}5\,[J]$

$P = \frac{2{,}5\,[J]}{[døgn]}$

11.349

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

Q: ladning, I: strøm, t: tid

Strøm er ladningen som passerer et tverrsnitt av en leder per tid

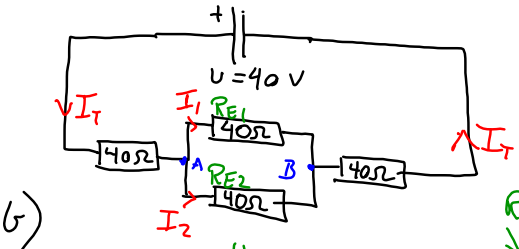
$U = \frac{W_{AB}}{Q}$

W_{AB}: arbeid, U: spenning, Q: ladning

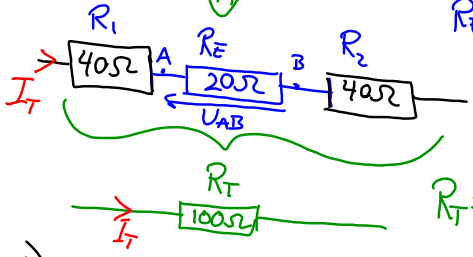
Spenningen er arbeidet som må gjøres for å flytte en ladning fra A til B, per ladning

Kirchoff's 2. lov (spenningsloven) sier at summen av alle spenningen i en sløyfe er lik null

11.349



b)



$R_E = \frac{40 \cdot 40}{40+40} = \frac{1600}{80} = 20\Omega$

$R_T = 40\Omega + 20\Omega + 40\Omega = 100\Omega$

c) $I_T = \frac{U}{R_T} = \frac{40[V]}{100[\Omega]} = 0{,}4\,[A]$

Strømmene I_1 og I_2 blir begge $\frac{I_T}{2} = \frac{0{,}4}{2} = 0{,}2A$, fordi motstandene i hver leddning er like

d) $U_{AB} = I_T \cdot 20[\Omega] = 0{,}4[A] \cdot 20[\Omega] = 8{,}0[V]$

e) $E = P \cdot t = U \cdot I_T \cdot 6{,}0[s] = 40[V] \cdot 0{,}4[A] \cdot 6{,}0[s]$

tiden

$= 96\,[J]$

$E_{R1} = U_{R1} \cdot I_T \cdot 6{,}0[s] = I_T^2 \cdot R_1 \cdot 6{,}0[s] = 0{,}4^2 \cdot 40 \cdot 6{,}0$

$= 38{,}4\,[J]$

$E_{R2} = U_{R2} \cdot I_T \cdot 6{,}0[s] = I_T^2 \cdot R_2 \cdot 6{,}0[s] = 0{,}4^2 \cdot 40 \cdot 6{,}0$

$= 38{,}4\,[J]$

$E_{RE1} = E_{RE2} = U_{AB} \cdot I_1 \cdot 6{,}0[s] = I_1^2 \cdot R_{E1} \cdot 6{,}0[s]$

$= 0{,}2^2 \cdot 40 \cdot 6{,}0 = 9{,}6\,[J]$

f) $P_{R1} = I_T \cdot U_{R1} = I_T^2 \cdot R_1 = 0{,}4^2 \cdot 40 = 6{,}4\,[W]$