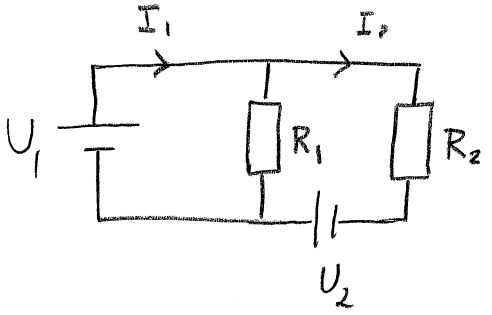
LF til kontinuasjons-eksamen vår 2010.

LF er knapt og ufullstendig.

1



a) $U_1 + U_2 = R_2 \cdot I_2$

$$I_2 = \frac{U_1 + U_2}{R_2} = \frac{13\,V}{50\,\Omega} = \underline{0.26\,A}$$

b) $(I_1 - I_2) R_1 = U_1$

$$I_1 = I_2 + \frac{U_1}{R_1} = \frac{U_1 + U_2}{R_2} + \frac{U_1}{R_1}$$

$$I_1 - I_2 = \frac{U_1}{R_1} = \underline{0.04\,A} = \frac{R_1(U_1 + U_2) + R_2 U_1}{R_1 \cdot R_2}$$

$$= \frac{100 \cdot 13 + 50 \cdot 4}{50 \cdot 100}$$

$$I_1 = \frac{1500}{50 \cdot 100} = \underline{0.30\,A}$$

Så strømmen gjennom motstand R_1 er $\underline{0.04\,A}$

2 a) $R = \frac{\rho \cdot L}{A}$ så $A = \frac{\rho \cdot L}{R}$

$$A = \frac{2.65 \cdot 10^{-8}\,\Omega m \cdot 10^5\,m}{500\,\Omega} = 5.3 \cdot 10^{-8+5-3}\,m^2$$

$$= 5.3 \cdot 10^{-6}\,m^2 = \underline{5.3\,mm^2}$$

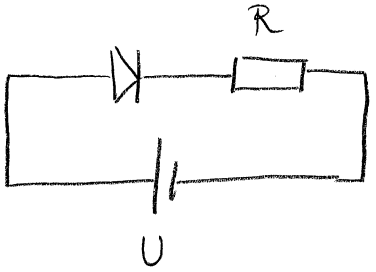
b) Strøm gjennom ledninge. $I \cdot U = P$, $I = \frac{P}{U} = \underline{3A}$

Spenning over strømledningen: $R \cdot I = R \cdot P/U$.

Effektapet er $R \cdot P/U \cdot P/U = R \cdot P^2/U^2$.

Effektap/Effekt $= \frac{RP^2/U^2}{P} = \frac{R \cdot P}{U^2} = \frac{500 \cdot 3000\,k}{1000^2\,k^2} = 1.5 \cdot 10^{-3} = \underline{0.15\%}$

3.



$$I = I_0 \left(e^{U_d/U_T} - 1 \right)$$

$$I \cdot R = U_R$$

$$U_R = I \cdot R$$

$$U_d = U_T \ln\left(1 + \frac{I}{I_0}\right)$$

$$U = I \cdot R + U_T \ln\left(1 + I/I_0\right)$$

numerisk finner vi at:

$$I \cdot 2000 + 0.026 \ln(I \cdot 10^8) = 2.0\,V \quad \text{gir}$$

$$\Rightarrow \quad I = 0.85\,mA$$

Forklar.