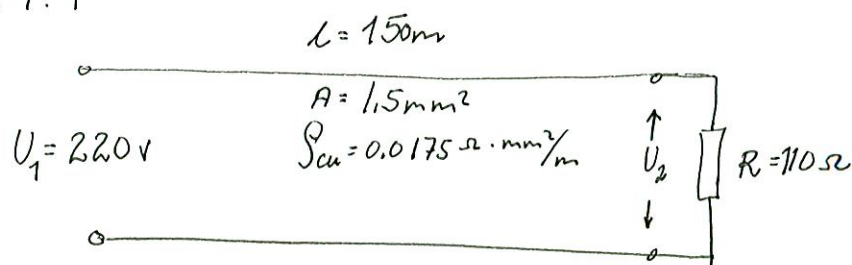


### 3.4 SPENNINGSTAP I EN LEDER

#### 3.4.1



$$a) R_L = \frac{\rho \cdot l}{A} = \frac{0,0175\Omega \cdot \text{mm}^2/\text{m} \cdot 150\text{m}}{1,5\text{mm}^2} = \underline{\underline{1,75\Omega}}$$

$$b) I = \frac{U}{R + (2 \cdot R_L)} = \frac{220\text{V}}{110\Omega + (2 \cdot 1,75\Omega)} = \underline{\underline{1,94\text{A}}}$$

$$\Delta U_L = I \cdot R_L = 1,94\text{A} \cdot 1,75\Omega = \underline{\underline{3,39\text{V}}}$$

$$c) U_2 = U - (2 \cdot \Delta U_L) = 220\text{V} - (2 \cdot 3,39\text{V}) = \underline{\underline{213,2\text{V}}}$$

$$d) \frac{U_1 \cdot X(\%)}{100} = \Delta U_L$$

$$\frac{220\text{V} \cdot X}{100} = 3,39\text{V} \cdot 2$$

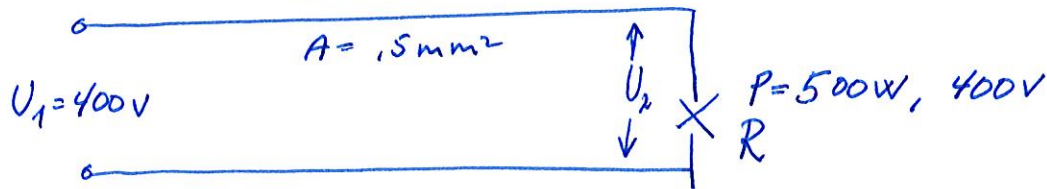
$$X = \frac{3,39\text{V} \cdot 2 \cdot 100}{220\text{V}} = \underline{\underline{3,08\%}}$$

$$e) P_{\text{Cu}} = I^2 \cdot R_L = 1,94^2 \cdot 1,75\Omega \cdot 2 = \underline{\underline{13,2\text{W}}}$$

3.4.2

$$\rho = 0,0175 \Omega \cdot \text{mm}^2/\text{m}$$

$$l = 260 \text{ m}$$



$$a) R_L = \frac{\rho \cdot l \cdot 2}{A} = \frac{0,0175 \Omega \cdot \text{mm}^2/\text{m} \cdot 260 \text{ m} \cdot 2}{1,5 \text{ mm}^2} = \underline{6,07 \Omega}$$

$$R = \frac{U^2}{P} = \frac{400 \text{ V}^2}{500 \text{ W}} = \underline{320 \Omega} \quad \text{RESISTANSEN ER EN KONSTANT VERPI.}$$

$$I = \frac{U}{R_L + R} = \frac{400 \text{ V}}{6,07 \Omega + 320 \Omega} = \underline{1,23 \text{ A}}$$

$$\Delta U_L = I \cdot R_L = 1,23 \text{ A} \cdot 6,07 \Omega = \underline{7,47 \text{ V}}$$

$$b) \frac{U_1 \cdot x\%}{100} = \Delta U_L$$

$$x = \frac{\Delta U_L \cdot 100}{U_1} = \frac{7,47 \text{ V} \cdot 100}{400 \text{ V}} = \underline{1,87\%}$$

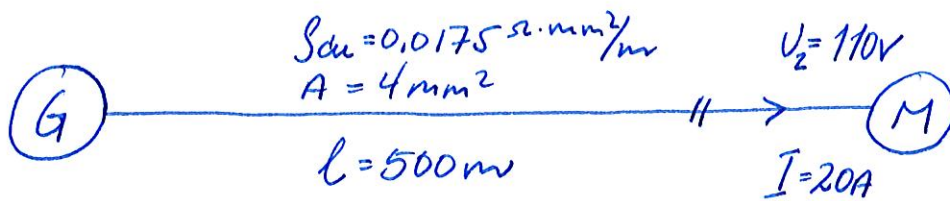
$$c) U_2 = U - \Delta U_L = 400 \text{ V} - 7,47 \text{ V} = \underline{392,5 \text{ V}}$$

$$P = \frac{U^2}{R} = \frac{392,5 \text{ V}^2}{320 \Omega} = \underline{481,5 \text{ W}}$$

$$P_{\text{cu}} = I^2 \cdot R_L = 1,23 \text{ A}^2 \cdot 6,07 \Omega = \underline{9,18 \text{ W}}$$

$$P_{\text{taale}} = P + P_{\text{cu}} = 481,5 \text{ W} + 9,18 \text{ W} = \underline{490,7 \text{ W}}$$

3.4.3



$$\Delta U_L = \frac{\rho \cdot I \cdot 2 \cdot l}{A} = \frac{0,0175\ \Omega \cdot \text{mm}^2/\text{m} \cdot 20\text{A} \cdot 2 \cdot 500\text{m}}{4\text{mm}^2} = \underline{87,5\text{V}}$$

$$U_1 = U_2 + \Delta U = 110\text{V} + 87,5\text{V} = \underline{\underline{197,5\text{V}}}$$

3.4.4



$$P = U \cdot I \Rightarrow \frac{I}{\text{A}} = \frac{P}{U} = \frac{100 \cdot 10^3\text{W}}{400\text{V}} = \underline{250\text{A}}$$

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