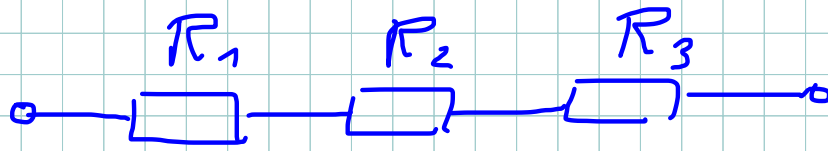


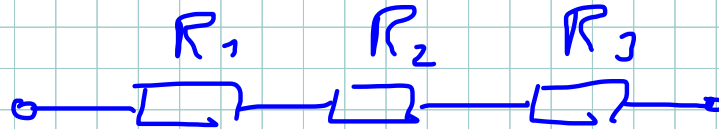
3.1



$$R_1 = 8 \Omega \quad R_2 = 12 \Omega \quad R_3 = 20 \Omega$$

$$\begin{aligned} R_g &= R_1 + R_2 + R_3 = \\ &= 8 + 12 + 20 = \\ &= 40 \Omega \end{aligned}$$

3.2



$$R_g = 6 \text{ k} \Omega$$

$$R_1 = 800 \Omega$$

$$R_3 = 400 \Omega$$

$$R_g = R_1 + R_2 + R_3$$

$$R_2 = R_g - R_1 - R_3$$

$$= 6 \text{ k} - 800 - 400$$

$$= 4800 \Omega = 4,8 \text{ k} \Omega$$

3.3

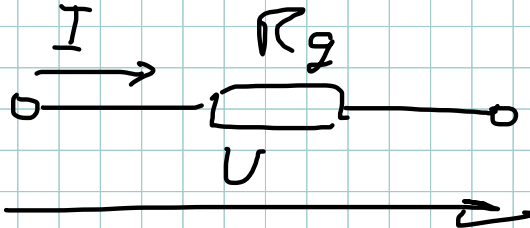


$$U = 230 \text{ V}$$

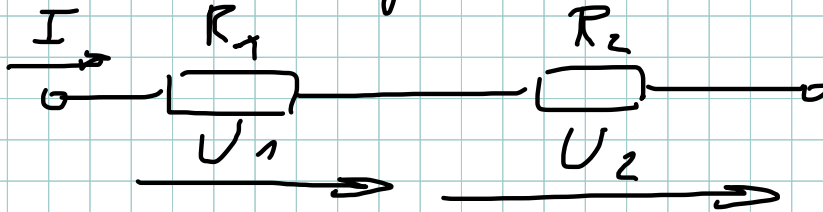
$$R_1 = 250 \Omega$$

$$R_2 = 500 \Omega$$

$$R_g = R_1 + R_2 = 250 + 500 \\ = 750 \Omega$$



$$I = \frac{U}{R_g} = \frac{230}{750} = 0,306 \text{ A}$$

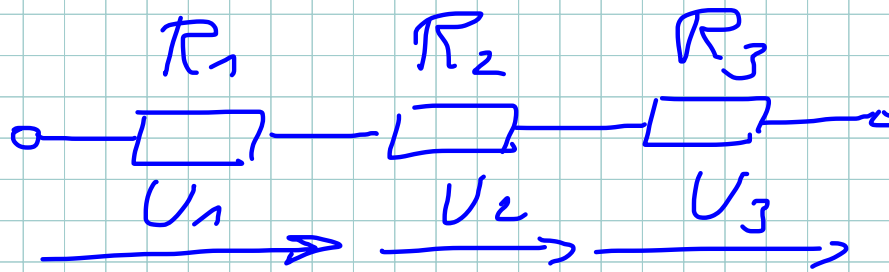


$$U_1 = I_1 \cdot R_1 = 0,306 \cdot 250 = \\ = 77,5 \text{ V}$$

$$U_2 = I_2 \cdot R_2 = 0,306 \cdot 500 = \\ = 153 \text{ V}$$

$$U = U_1 + U_2 = 77,5 + 153 = 230,5 \text{ V}$$

3.4

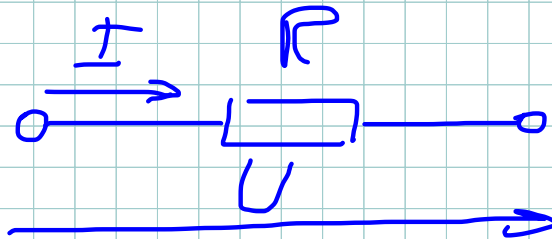


$$R_g = 300 \Omega$$

$$R_1 = 80 \Omega$$

$$R_2 = 180 \Omega$$

$$I = 200 \text{ mA}$$



$$U = I \cdot R = 300 \cdot 200 \text{ m} = 60 \text{ V}$$

$$R_g = R_1 + R_2 + R_3$$

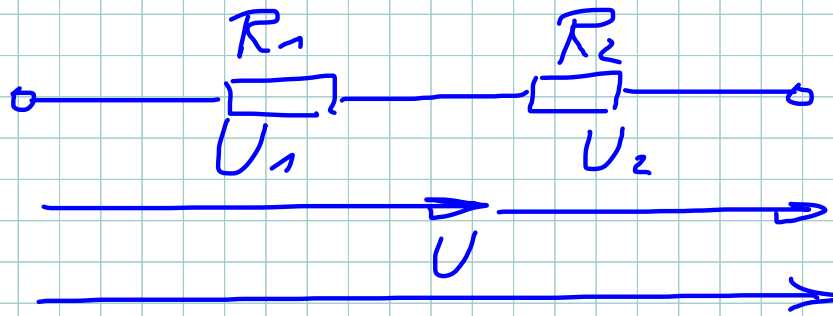
$$R_3 = R_g - R_1 - R_2$$

$$= 300 - 80 - 180$$

$$= 40 \Omega$$

$$U_1 = I_1 \cdot R_1 = 200 \text{ m} \cdot 80 = 16 \text{ V}$$

3.5



$$U = 6V \quad I = 0,3A$$

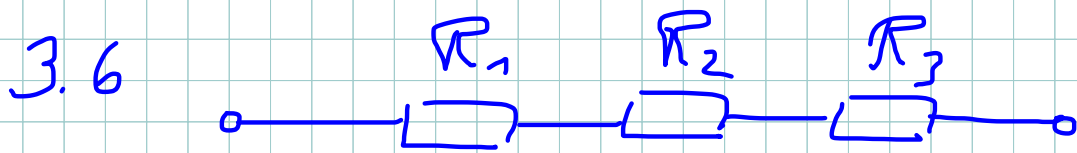
$$U_2 = 2V$$

$$U_1 = U - U_2 = 6 - 2 = 4V$$

$$R = \frac{U}{I} = \frac{6}{0,3} = 20\Omega$$

$$R_1 = \frac{U_1}{I_1} = \frac{4}{0,3} = 13,3\Omega$$

$$R_2 = \frac{U_2}{I_2} = \frac{2}{0,3} = 6,6\Omega$$



$$I = 10 \text{ mA}$$

$$R_1 = 200 \Omega$$

$$R_2 = 0,12 \text{ k}\Omega$$

$$R_3 = 0,008 \text{ M}\Omega$$

$$R = R_1 + R_2 + R_3$$

$$= 200 + 0,12 \text{ k} + 0,008 \text{ M} =$$

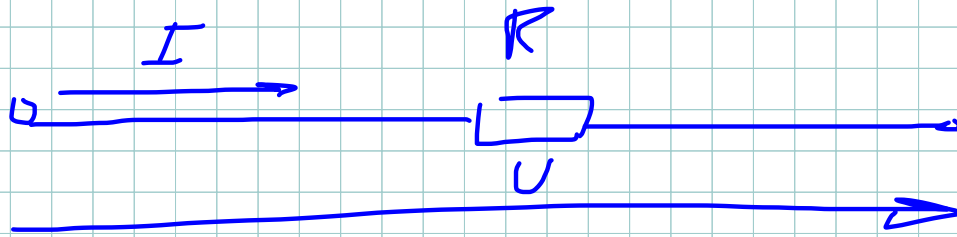
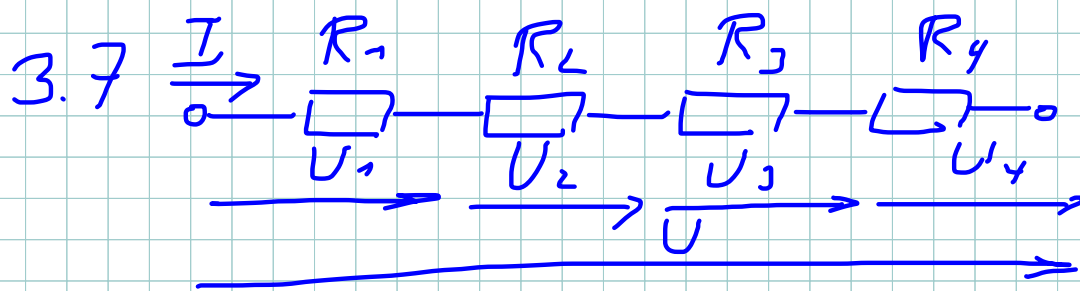
$$= 8,32 \text{ k}\Omega = 8320 \Omega$$

$$U = I \cdot R = 10 \text{ mA} \cdot 8,32 \text{ k} = 83,2 \text{ V}$$

$$U_1 = I \cdot R_1 = 10 \text{ mA} \cdot 200 = 2 \text{ V}$$

$$U_2 = I \cdot R_2 = 10 \text{ mA} \cdot 0,12 \text{ k} = 1,2 \text{ V}$$

$$U_3 = I \cdot R_3 = 10 \text{ mA} \cdot 0,008 \text{ M} = 80 \text{ V}$$



$$\begin{aligned}
 R &= R_1 + R_2 + R_3 + R_4 = \\
 &= 700 + 2,4 \text{ k} + 0,036 \text{ M} + 900 = \\
 &= 40\,000 \, \Omega = 40 \text{ k} \, \Omega \\
 I &= \frac{U}{R} = \frac{120}{40 \text{ k}} = 3 \text{ mA}
 \end{aligned}$$

$$U_1 = I \cdot R_1 = 3 \text{ mA} \cdot 700 = 2,1 \text{ V}$$

$$U_2 = I \cdot R_2 = 3 \text{ mA} \cdot 2,4 \text{ k} = 7,2 \text{ V}$$

$$U_3 = I \cdot R_3 = 3 \text{ mA} \cdot 0,036 \text{ M} = 108 \text{ V}$$

$$U_4 = I \cdot R_4 = 3 \text{ mA} \cdot 900 = 2,7 \text{ V}$$

Kontrolle:

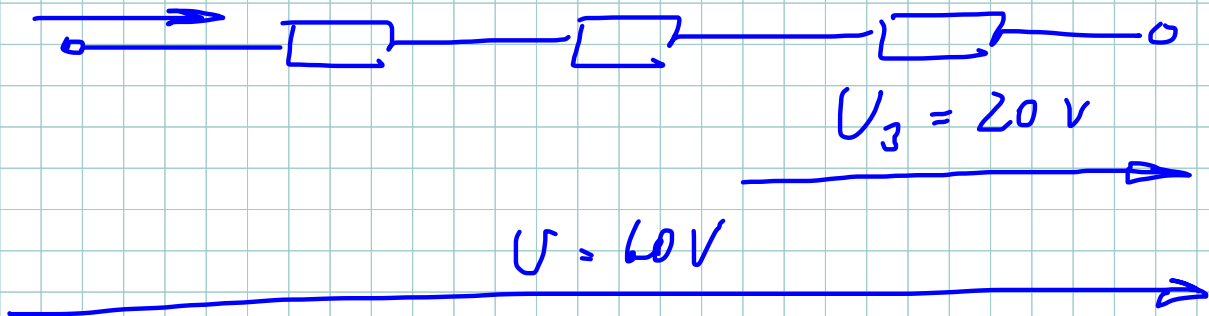
$$U = U_1 + U_2 + U_3 + U_4 = 2,1 + 7,2 + 108 + 2,7 = 120 \text{ V}$$

3.8

$$I = 0,5 \text{ A}$$

 $R_1$ 

$$R_2 = 60 \Omega$$

 $R_3$ 

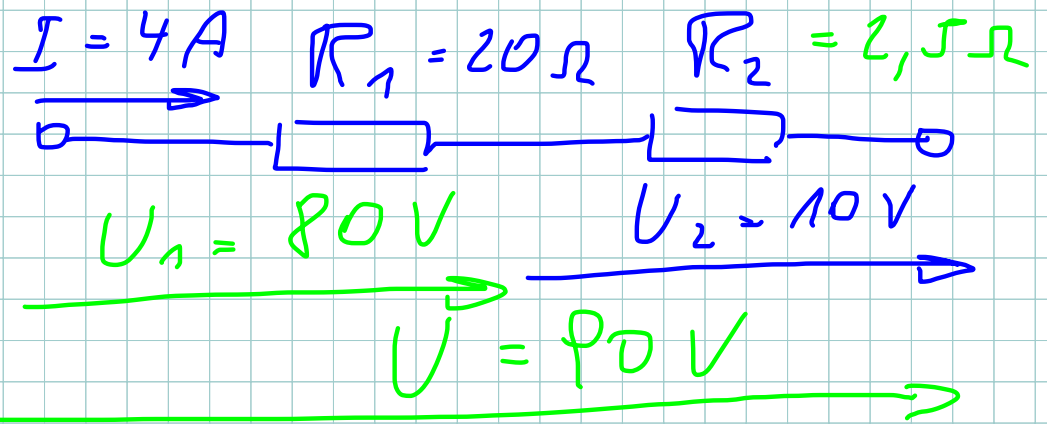
$$U_2 = I \cdot R_2 = 0,5 \cdot 60 = 30 \text{ V}$$

$$U_1 = U - U_2 - U_3 = 60 - 30 - 20 = 10 \text{ V}$$

$$R_1 = \frac{U_1}{I} = \frac{10}{0,5} = 20 \Omega$$

$$R = \frac{U}{I} = \frac{60}{0,5} = 120 \Omega$$

3.9



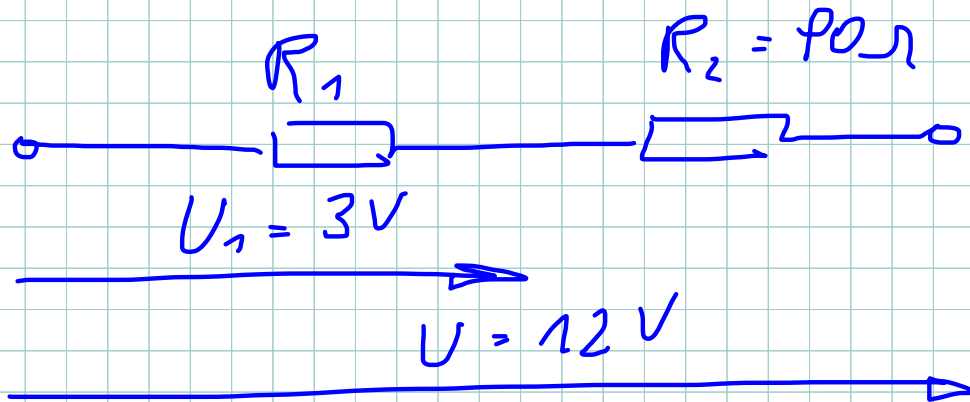
$$U_1 = I_1 \cdot R_1 = 4 \cdot 20 = 80\text{ V}$$

$$R_2 = \frac{U_2}{I_2} = \frac{10}{4} = 2,5\ \Omega$$

$$U_g = U_1 + U_2 = 80 + 10 = 90\text{ V}$$



3.10



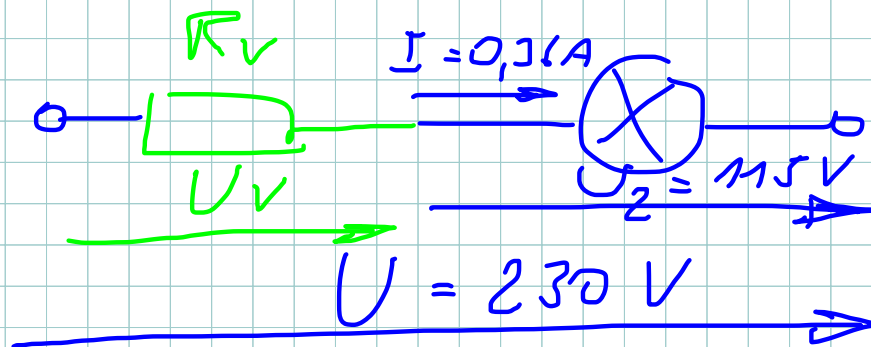
$$U_2 = U - U_1 = 12 - 3 = 9 \text{ V}$$

$$I = \frac{U_2}{R_2} = \frac{9}{90} = 0,1 \text{ A}$$

$$R_1 = \frac{U_1}{I} = \frac{3}{0,1} = 30 \Omega$$

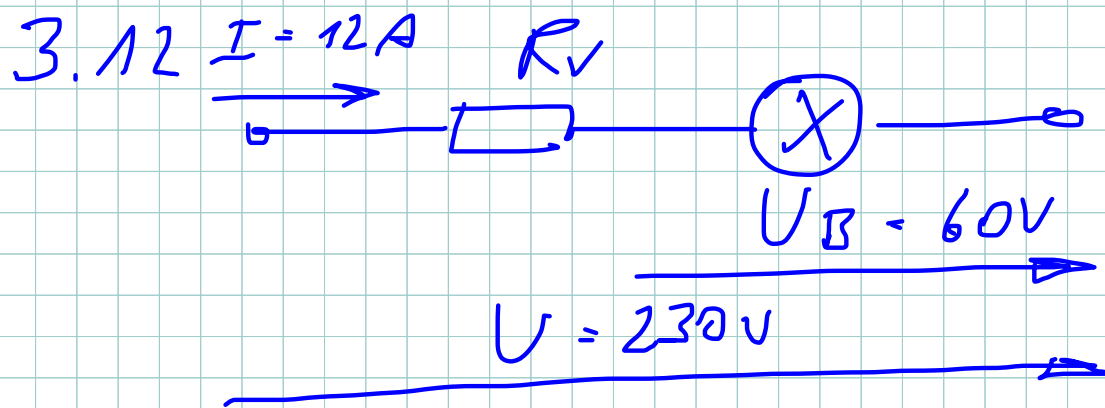
$$R = R_1 + R_2 = 30 + 90 = 120 \Omega$$

3.11



$$U_V = U - U_{\text{Glowlampe}} = 230 - 115 = \\ = 115V$$

$$R_V = \frac{U_V}{I} = \frac{115}{0,36} = 319,4 \Omega$$



$$S = 4 \frac{\text{A}}{\text{mm}^2}$$

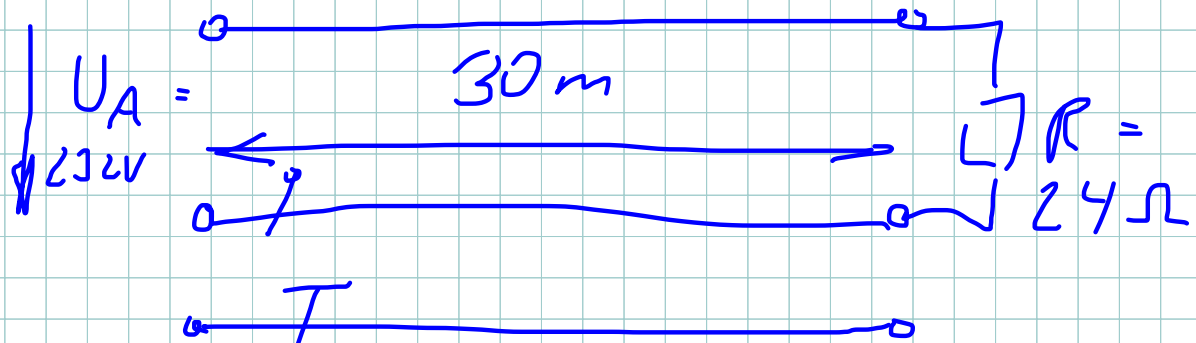
$$U_V = U - U_B = 230 - 60 = 170\text{ V}$$

$$R_V = \frac{U_V}{I} = \frac{170}{12} = 14,2\ \Omega$$

$$S = \frac{I}{A} \Rightarrow A = \frac{I}{S} = \frac{12}{4} = 3\text{ mm}^2$$

3.13

YM 3x1,5#



$$R_L = \frac{l}{\gamma \cdot A} = \frac{30}{56 \cdot 1,5} = 0,357 \Omega$$

$$R_g = R_L + R_H + R_L =$$

$$= 2 \cdot 0,357 + 24 = 24,71 \Omega$$

$$I = \frac{U}{R} = \frac{232}{24,71} = 9,387 \text{ A}$$

$$U_L = 2 \cdot I \cdot R_L = 2 \cdot 9,387 \cdot 0,357 =$$

$$= 6,7 \text{ V}$$

$$U_E = U_A - U_L = 232 - 6,7 = 225,3 \text{ V}$$

3.14



$$\rho = 0,4 \frac{\Omega \text{ mm}^2}{\text{m}}$$

$$A = 2,5 \text{ mm}^2$$

$$l = 32 \text{ m}$$

$$R_A = \frac{l \cdot \rho}{A} = \frac{32 \cdot 0,4}{2,5} = 5,12 \Omega$$

$$R = R_A + R_M = 5,12 + 1 = 6,12 \Omega$$

$$I = \frac{U}{R} = \frac{115}{6,12} = 18,8 \text{ A}$$