



Lösungen

Thema: Ohmsches Gesetz – Teil 1

$$1. \quad I = \frac{U}{R} = \frac{230 \text{ V}}{40 \Omega} = 5,75 \text{ A}$$

$$2. \quad U = R \cdot I = 265 \Omega \cdot 0,3 \text{ A} = 79,5 \text{ V}$$

$$3. \quad R = \frac{U}{I} = \frac{12 \text{ V}}{0,150 \text{ A}} = 80 \Omega$$

$$G = \frac{1}{R} = \frac{1}{80 \Omega} = 0,0125 \text{ S} = 12,5 \text{ mS}$$

$$4. \quad \text{a) } I_1 = \frac{U}{R_1} = \frac{12 \text{ V}}{20 \Omega} = 0,60 \text{ A}; \quad I_2 = \frac{U}{R_2} = \frac{12 \text{ V}}{100 \Omega} = 0,12 \text{ A}$$

$$\text{b) } I_1 = \frac{U \cdot \frac{1}{2}}{R_1} = \frac{6 \text{ V}}{20 \Omega} = 0,30 \text{ A}; \quad I_2 = 0,060 \text{ A}$$

Die Ströme ändern sich proportional mit der Spannung: z. B. $\frac{1}{2} U \cong \frac{1}{2} I$

$$5. \quad I = \frac{U}{R} = \frac{30 \text{ V}}{45 \text{ k}\Omega} = 0,67 \text{ mA}$$

$$6. \quad \text{a) } R = \frac{U}{I} = \frac{240 \text{ mV}}{30 \mu\text{A}} = 8 \text{ k}\Omega$$

$$\text{b) } G = \frac{1}{R} = \frac{1}{8 \text{ k}\Omega} = 0,125 \text{ mS}$$

$$7. \quad U = R \cdot I = 8 \text{ m}\Omega \cdot 16 \text{ A} = 128 \text{ mV}$$

$$8. \quad R = \frac{U_1}{I_1} = \frac{230 \text{ V}}{4,35 \text{ A}} = 52,87 \Omega$$

$$U_2 = U_1 \cdot 1,05 = 230 \text{ V} \cdot 1,05 = 241,5 \text{ V}$$

$$I_2 = \frac{U_2}{R} = \frac{241,5 \text{ V}}{52,87 \Omega} = 4,57 \text{ A}$$

$$9. \quad \text{a) } R = \frac{U}{I} = \frac{6 \text{ V}}{0,05 \text{ A}} = 120 \Omega$$

$$\text{b) } G = \frac{1}{R} = \frac{1}{120 \Omega} = 8,33 \text{ mS}$$

$$\text{c) } I = \frac{U}{R} = \frac{9 \text{ V}}{120 \Omega} = 75 \text{ mA}$$

$$10. \quad \text{a) } R = \frac{U}{I} = \frac{10 \text{ kV}}{0,12 \text{ A}} = 83,3 \text{ k}\Omega$$

$$\text{b) } G = \frac{1}{R} = \frac{1}{83,3 \text{ k}\Omega} = 12 \cdot 10^{-6} \text{ S} = 12 \mu\text{S}$$

$$11. \quad \text{a) Aus U-I-Diagramm bei } U = 6 \text{ V: } I_1 = 12 \text{ A}; \quad I_2 = 6 \text{ A}; \quad I_3 = 3 \text{ A}$$

$$\text{b) } R_1 = \frac{U}{I_1} = \frac{6 \text{ V}}{12 \text{ A}} = 0,5 \Omega; \quad R_2 = 1,0 \Omega; \quad R_3 = 2,0 \Omega$$



Lösungen

Thema: Ohmsches Gesetz – Teil 2

12. a) Aus Diagramm: $I_1 = 3 \text{ A}$; $I_2 = 1,5 \text{ A}$

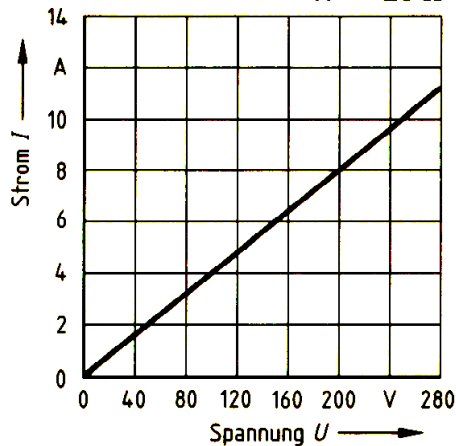
b) $U = R_1 \cdot I_1 = R_2 \cdot I_2 = 20 \Omega \cdot 3 \text{ A} = 40 \Omega \cdot 1,5 \text{ A} = 60 \text{ V}$

13. a) $R = \frac{1}{G} = \frac{1}{40 \text{ mS}} = 25 \Omega$;

$$I = \frac{U}{R} = \frac{230 \text{ V}}{25 \Omega} = 9,2 \text{ A}$$

b) $U = 0 \text{ V} \Rightarrow I = 0 \text{ A}$

z. B. $U = 200 \text{ V} \Rightarrow I = \frac{U}{R} = \frac{200 \text{ V}}{25 \Omega} = 8 \text{ A}$



c) Aus Diagramm: $U \approx 150 \text{ V}$

14. a) $R_1 = \frac{U_1}{I_1} = \frac{4 \text{ V}}{0,02 \text{ A}} = 200 \Omega$; $R_3 = \frac{U_3}{I_3} = \frac{4 \text{ V}}{0,005 \text{ A}} = 800 \Omega$

b) $U_2 = R_2 \cdot I_2 = 1 \text{ k}\Omega \cdot 5 \text{ mA} = 5 \text{ V}$

c) $I_4 = \frac{U_4}{R_4} = \frac{9 \text{ V}}{600 \Omega} = 15 \text{ mA}$

15. $R = \frac{U}{I} = \frac{13 \text{ V}}{0,02 \text{ A}} = 650 \Omega$

16. $R = \frac{\Delta U}{\Delta I} = \frac{230 \text{ V} - 180 \text{ V}}{0,1 \text{ A}} = 500 \Omega$; $G = \frac{1}{R} = \frac{1}{0,5 \text{ k}\Omega} = 2 \text{ mS}$

17. Aus Kennlinie: A1: $U_1 = 0,50 \text{ V}$; $I_1 \approx 6 \text{ mA}$

A2: $U_2 = 0,67 \text{ V}$; $I_2 = 20 \text{ mA}$

$$R_1 = \frac{U_1}{I_1} = \frac{0,5 \text{ V}}{6 \text{ mA}} = 83,3 \Omega; \quad R_2 = \frac{U_2}{I_2} = \frac{0,67 \text{ V}}{20 \text{ mA}} = 33,5 \Omega$$