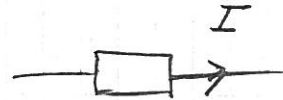ETII, 37

a)

Lampen : $P = 40\,W$, $U = 125\,V$

⊗—   ohmsche Verbraucher   ▭——→ I

$$P = U \cdot I \rightarrow I = \frac{P}{U} = \underline{0.32\,A} \qquad \overset{\longrightarrow}{U}$$

$$R = U/I = 390.63\,\Omega$$

ESB :
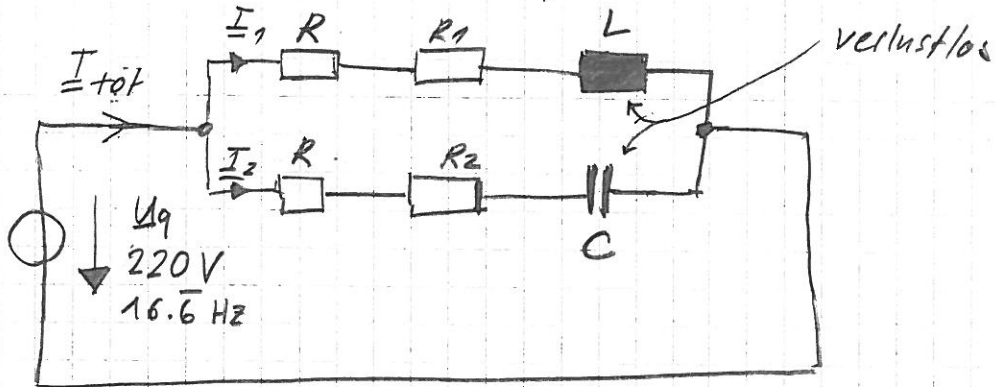
Anforderung :
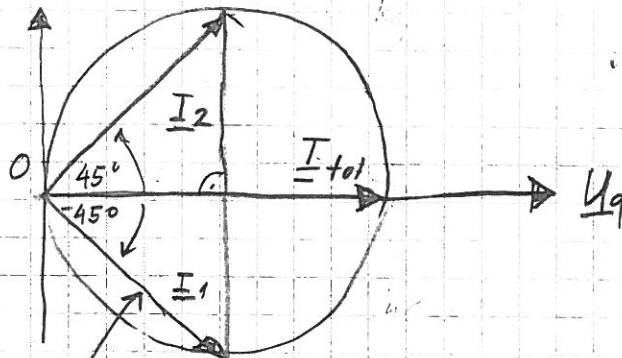
$$|\underline{I_1}| = |\underline{I_2}| = I = 0.32\,A$$

Zweig 1
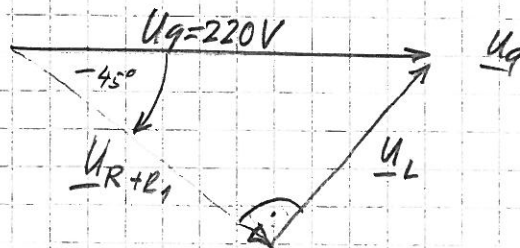
$$\left| \underline{U}_{R+R_1} \right| = \frac{U_g}{\sqrt{2}} = 155.6\,V$$
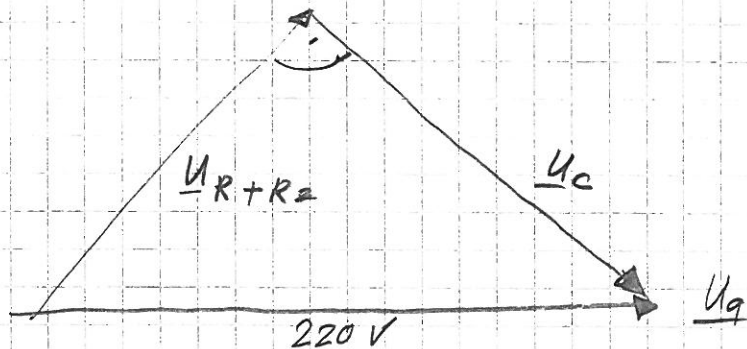
$$U_{R1} = |\underline{U}_{R+R_1}| - 125 = 30.56\,V$$

$$R_1 = \frac{U_{R1}}{I} = \frac{30.56\ V}{0.32\ A} = 95.5\ \Omega$$

$$U_L = \frac{U_q}{\sqrt{2}} = \frac{220\ V}{\sqrt{2}} = 155.6\ V$$

$$X_L = \frac{U_L}{I} = \frac{155.6}{0.32} = 486.1\ \Omega$$

$$L = \frac{X_L}{\omega} = \frac{486.1}{2\pi \cdot 16\,\tfrac{2}{3}} = \underline{\underline{4.64}}\ H$$

<u>Zweig 2</u>

$$|\underline{U}_{R+R_2}| = \frac{U_q}{\sqrt{2}} = 155.6\ V \quad \rightarrow \quad R_2 = 95.5\ \Omega$$

$$U_C = \frac{U_q}{\sqrt{2}} = 155.6\ V$$

$$X_C = \frac{U_C}{I} = 486.1\ \Omega$$

$$X_C = \frac{1}{\omega C} \quad \rightarrow \quad C = \frac{1}{\omega X_C} = \frac{1}{2\pi \cdot 16\,\tfrac{2}{3} \cdot 486.1}$$

$$= \underline{\underline{19.643\ \mu F}}$$

b)
$$P = I^2 \cdot (R + R_1) + I^2 \cdot (R + R_2) = I^2 (2R + R_1 + R_2)$$
$$= 0.32^2 (2 \cdot 390.63 + 2 \cdot 95.5) = \underline{99.6\ W}$$

c)
$$I_{tot} = \sqrt{2} \cdot I = \underline{\underline{0.45\ A}}$$