

# Kapitel 20

20.2  
geg:  $C = 0,1 \mu\text{F}$   
 $f = 50 \text{ Hz}$

$$X_C = \frac{1}{2 \pi f C}$$
$$= \frac{1}{2 \cdot \pi \cdot 50 \cdot 0,1 \mu}$$
$$= 31,8 \text{ k}\Omega$$

20.3  
 $C = 150 \text{ pF}$   
 $f = 3,6 \text{ MHz}$

$$X_C = \frac{1}{2 \cdot \pi \cdot f \cdot C}$$
$$= \frac{1}{2 \cdot \pi \cdot 3,6 \text{ M} \cdot 150 \text{ p}}$$
$$= 295 \Omega$$

20.4

geg:  $C = 250 \mu\text{F}$

$$f_1 = 1 \text{ kHz}$$

$$f_2 = 40 \text{ Hz}$$

$$X_{C1} = \frac{1}{2 \cdot \pi \cdot f_1 \cdot C}$$

$$= \frac{1}{2 \cdot \pi \cdot 1 \text{ k} \cdot 250 \mu} = 0,637 \Omega$$

$$X_{C2} = \frac{1}{2 \cdot \pi \cdot f_2 \cdot C}$$

$$= \frac{1}{2 \cdot \pi \cdot 40 \cdot 250 \mu} = 15,9 \Omega$$

20.5

geg:  $f = 50 \text{ Hz}$

$$X_C = 3183 \Omega$$

$$C = \frac{1}{2 \pi f X_C}$$

$$= \frac{1}{2 \cdot \pi \cdot 50 \cdot 3183} = 1 \mu\text{F}$$

20.6

geg:  $U = 230V$

$$I = 15 \text{ mA}$$

$$f = 50 \text{ Hz}$$

$$X_C = \frac{U}{I} = \frac{230}{15 \text{ mA}} = 15,3 \text{ k}\Omega$$

$$C = \frac{1}{2 \cdot \pi \cdot f \cdot X_C}$$

$$= \frac{1}{2 \cdot \pi \cdot 50 \cdot 15,3 \text{ k}\Omega} = 207,6 \text{ nF}$$

20.7

geg:  $C = 10 \text{ nF}$

$$X_C = 2 \text{ k}\Omega$$

$$f = \frac{1}{2 \pi C X_C}$$

$$= \frac{1}{2 \cdot \pi \cdot 10 \text{ n} \cdot 2 \text{ k}} = 7,96 \text{ kHz}$$

20.8

$$\text{geg: } f = 50 \text{ Hz}$$

$$X_C = 3000 \Omega$$

$$C = \frac{1}{2 \pi f X_C}$$

$$= \frac{1}{2 \cdot \pi \cdot 50 \cdot 3000} = 1,06 \mu\text{F}$$

$$f = \frac{1}{2 \cdot \pi \cdot C \cdot X_C}$$

$$= \frac{1}{2 \cdot \pi \cdot 1,06 \mu \cdot 100} = 1500 \text{ Hz}$$

20.9

$$\text{geg: } f = 100 \text{ Hz} \quad / \quad 200 \text{ Hz} \quad / \quad 400 \text{ Hz}$$

$$X_C = 800 \, \Omega \quad / \quad 400 \, \Omega \quad / \quad 200 \, \Omega$$

$$C = \frac{1}{2 \pi f X_C}$$

$$= \frac{1}{2 \cdot \pi \cdot 100 \cdot 800} = 1,99 \, \mu\text{F}$$

$$= \frac{1}{2 \cdot \pi \cdot 200 \cdot 400} = 1,99 \, \mu\text{F}$$

$$= \frac{1}{2 \cdot \pi \cdot 400 \cdot 200} = 1,99 \, \mu\text{F}$$

20.10

$$\text{geg: } C_1 = 220 \, \text{nF} \quad f = 2450 \, \text{Hz}$$

$$C_2 = 1 \, \mu\text{F} \quad U = 4,2 \, \text{V}$$

$$X_{C1} = \frac{1}{2 \cdot \pi \cdot f \cdot C_1} = \frac{1}{2 \cdot \pi \cdot 2450 \cdot 220 \, \text{n}} = 295 \, \Omega$$

$$X_{C2} = \frac{1}{2 \cdot \pi \cdot 2450 \cdot 1 \, \mu} = 65 \, \Omega$$

$$U_2 = U \cdot \frac{X_{C2}}{X_{C1} + X_{C2}} = 4,2 \cdot \frac{65}{295 + 65} = 0,757 \, \text{V}$$