

$$R_e = R_b + \frac{1}{\frac{1}{R_1} + \frac{1}{R_v + R_2}} = 0.1 + \frac{1}{\frac{1}{12} + \frac{1}{0.5 + 6}} = 4.316 \Omega$$

$$I_g = \frac{U_g}{R_e} = \frac{110}{4.316} = 25.49 A$$

$$U_g = I_g R_b + U_K \Rightarrow U_K = U_g - I_g R_b = 110 - 25.49 \cdot 0.1 = 107.45 V$$

$$I_1 = \frac{U_K}{R_1} = \frac{107.45}{12} = 8.95 A$$

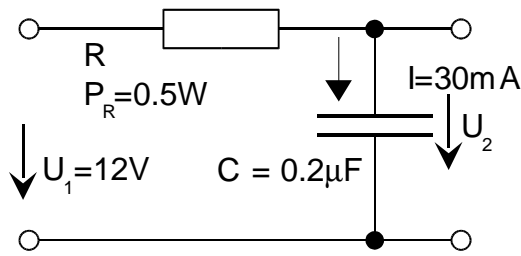
$$P_1 = U_K \cdot I_1 = 107.45 \cdot 8.95 = 961.7 W$$

$$I_2 = I_g - I_1 = 25.49 - 8.95 = 16.54 A$$

$$U_2 = I_2 \cdot R_2 = 16.54 \cdot 6 = 99.24 V$$

$$P_2 = U_2 \cdot I_2 = 99.24 \cdot 16.54 = 1641.43 W$$

2.



$R = \dots\dots\dots\Omega$   
 $X_C = \dots\dots\dots\Omega$   
 $f = \dots\dots\dots\text{Hz}$   
 $U_2 = \dots\dots\dots\text{V}$   
 $U_R = \dots\dots\dots\text{V}$   
 vektorábra  
 $C = 0.2\mu\text{F} = 0.2 \cdot 10^{-6}\text{F} = 2 \cdot 10^{-7}\text{F}$

$I = 30\text{mA} = 30 \cdot 10^{-3}\text{A} = 3 \cdot 10^{-2}\text{A}$

$P_R = I^2 R \Rightarrow R = \frac{P_R}{I^2} = \frac{0.5}{(3 \cdot 10^{-2})^2} = 555.55\Omega$

$Z = \frac{U_1}{I} = \frac{12}{3 \cdot 10^{-2}} = 400\Omega$

$Z = \sqrt{R^2 + X_C^2} \Rightarrow X_C = \sqrt{Z^2 - R^2} = \sqrt{400^2 - 555.5^2}$  a megadott  $P_R$  teljesítmény nagyobb a befolyó áram és a bemenő feszültség szorzatánál ( $12 \cdot 0.03 = 0.36\text{VA}$ ), a megadott adattal az áramkör nem működik.

Ha  $P_R$  pl  $0.2\text{W}$  lenne:

$P_R = I^2 R \Rightarrow R = \frac{P_R}{I^2} = \frac{0.2}{(3 \cdot 10^{-2})^2} = 222.22\Omega$

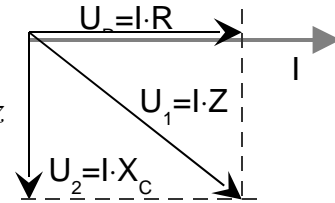
$Z = \frac{U_1}{I} = \frac{12}{3 \cdot 10^{-2}} = 400\Omega$

$Z = \sqrt{R^2 + X_C^2} \Rightarrow X_C = \sqrt{Z^2 - R^2} = \sqrt{400^2 - 222.22^2} = 332.6\Omega$

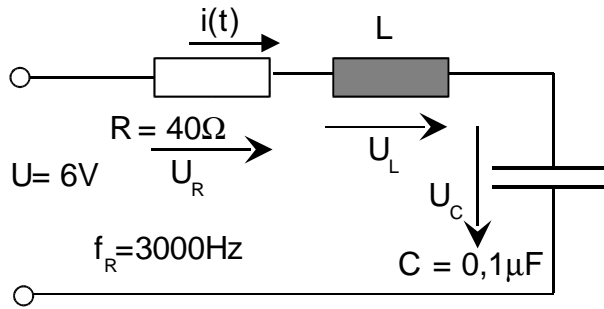
$X_C = \frac{1}{2\pi \cdot f \cdot C} \Rightarrow f = \frac{1}{2\pi \cdot X_C \cdot C} = \frac{1}{2\pi \cdot 332.6 \cdot 2 \cdot 10^{-7}} = 2392.6\text{Hz}$

$U_2 = I \cdot X_C = 3 \cdot 10^{-2} \cdot 332.6 = 9.978\text{V}$

$U_R = I \cdot R = 3 \cdot 10^{-2} \cdot 222.22 = 6.666\text{V}$



3.



$L = \dots\dots\dots H$   
 $U_{Lr} = \dots\dots\dots V$   
 $I = \dots\dots\dots A$   
 $X_L, X_C, Z$  a frekvencia függvényében.

$$f_r = \frac{1}{2\pi\sqrt{LC}} \Rightarrow L = \frac{1}{4\pi^2 f_r^2 C} = \frac{1}{4\pi^2 3000^2 \cdot 10^{-7}} = 0.02815H$$

$$U = U_R + U_L + U_C$$

Rezonanciafrekvencián  $U_L = -U_C \Rightarrow U = U_R = I \cdot R \Rightarrow I = \frac{U}{R} = \frac{6}{40} = 0.15A$

$$U_{Lr} = I \cdot X_L = I \cdot 2\pi \cdot f \cdot L = 0.15 \cdot 2\pi \cdot 3000 \cdot 0.02815 = 79.59V$$

