Solution

1. $Av = \dfrac{jL\omega}{R+jL\omega}$ $\quad$ **$Av = \dfrac{j\omega L/R}{1+j\omega L/R}$**

Av est une fonction de transfert d'un filtre RL passe-haut 1er ordre

2. $Av = \dfrac{j\omega L/R}{1+j\omega L/R} = \dfrac{j\omega/\omega_0}{1+j\omega/\omega_0}$ $\quad Gm = 1$ (gain maximal)

$\omega_0 = R/L = 2\pi fc \quad \Rightarrow \quad L = R/2\pi fc = 10^4/2\pi \text{ x } 3{,}5.10^3$ **$L = 455mH$**

3. $|Av| = \dfrac{Us}{Ue} = \dfrac{\frac{\omega}{\omega_0}}{\sqrt{1+\left(\frac{\omega}{\omega_0}\right)^2}}$

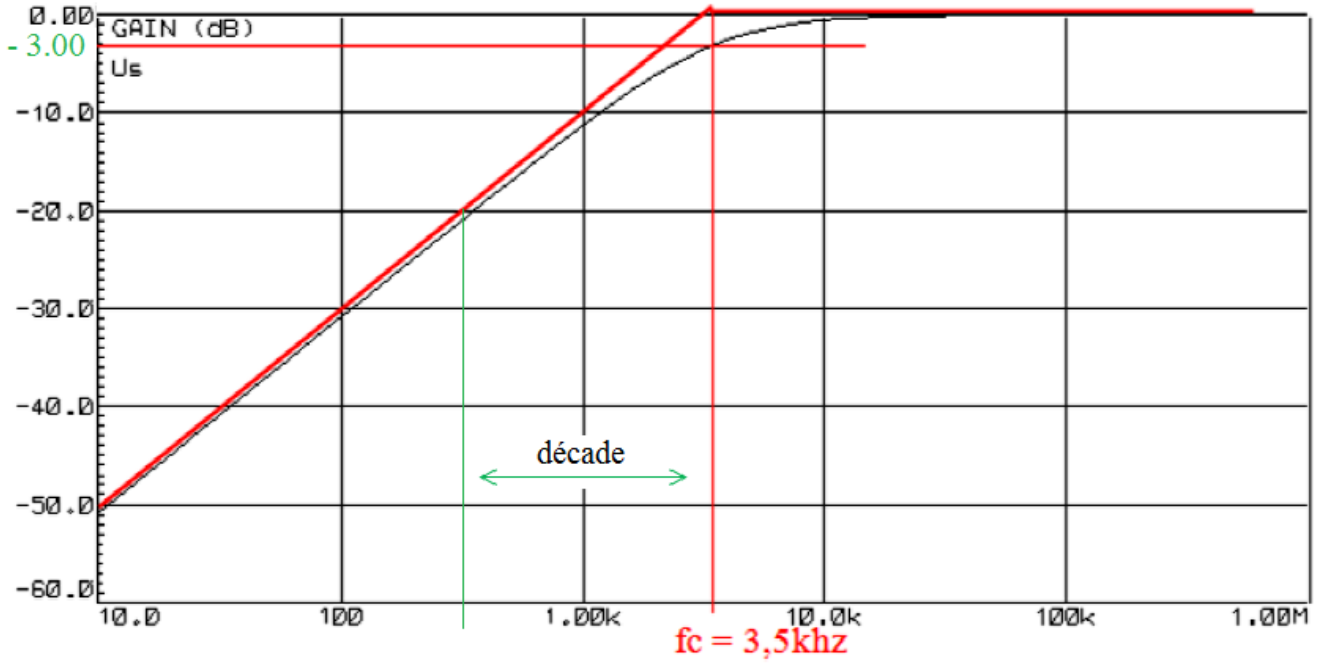
$\omega / \omega_0 = 2\pi f \ / 2\pi fc = f / fc \qquad |Av| = \dfrac{Us}{Ue} = \dfrac{\frac{f}{fc}}{\sqrt{1+\left(\frac{f}{fc}\right)^2}}$

$f = 7Khz$ donc $f / fc = 7khz / 3{,}5khz = 2$

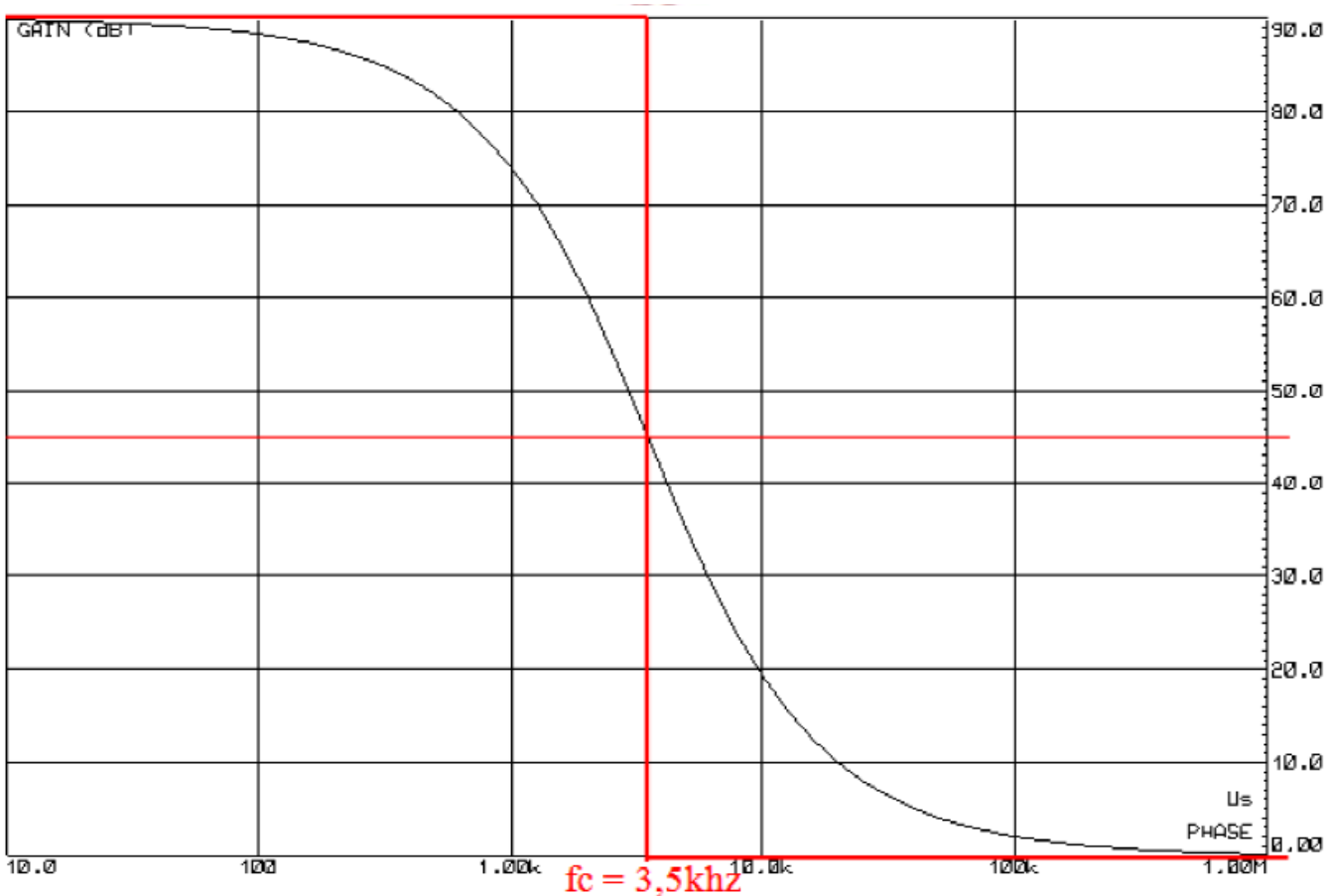
$Av = \dfrac{Us}{Ue} = \dfrac{2}{\sqrt{1+(2)^2}} = \dfrac{2}{\sqrt{5}}$

$\Rightarrow \quad Ue = Us \text{ x } \sqrt{5}/2 = 1{,}6V \text{ x } \sqrt{5}/2$ **$Ue = 1{,}79V$**

4.



fc = 3,5khz



fc = 3,5khz