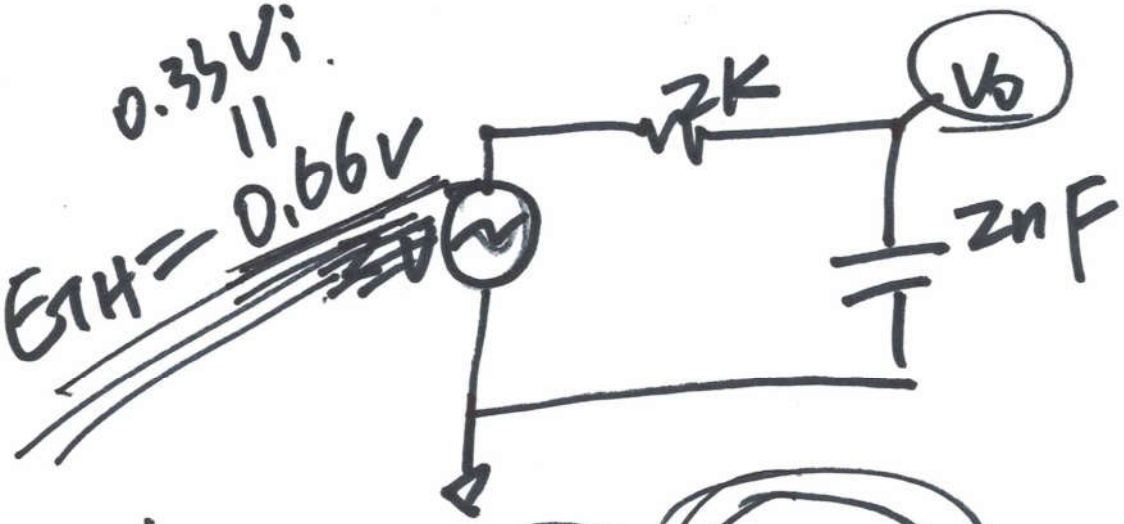
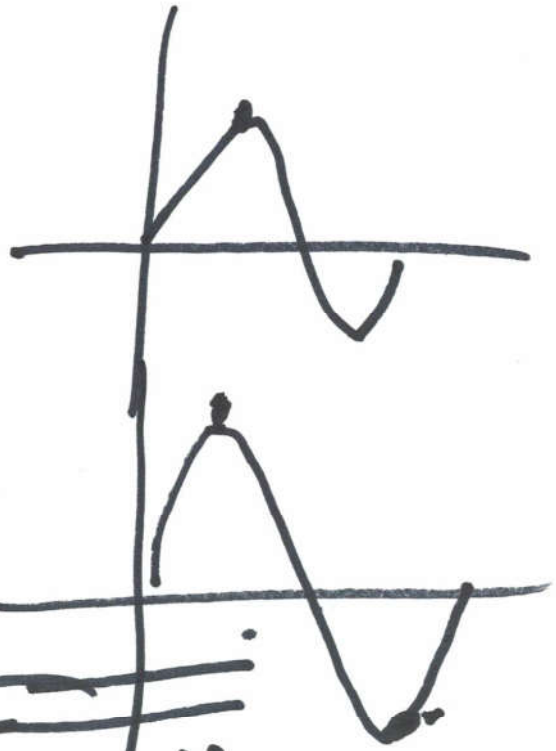




$V_i = 2V$

$\frac{0.66V}{2V} = 0.33 \Rightarrow 0.66V = 0.33V_i$

$$\left|\frac{V_o}{0.33V_i}\right| = \frac{1}{\sqrt{1^2 + (\omega RC)^2}} = \frac{1}{\sqrt{1^2 + (2\pi f \cdot 2K \cdot 2n)^2}}$$

$$\left|\frac{V_o}{0.33V_i}\right| = \frac{1}{\sqrt{1 + (6.28 \cdot 100K \cdot 2K \cdot 2n)^2}}$$

$$= \frac{1}{3.33} = 0.3$$

$= 0.11$

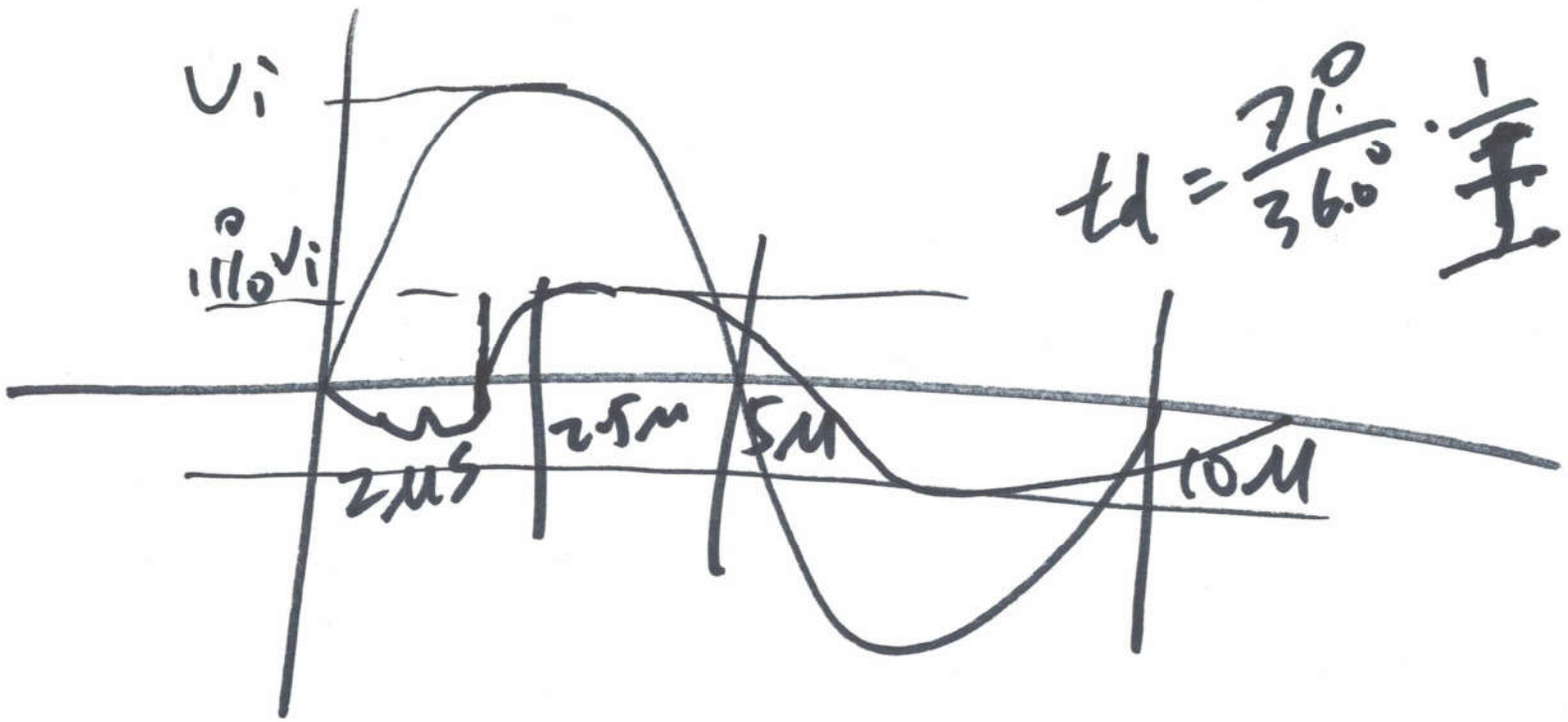
(1)

~~$\Delta\theta$~~ $\frac{V_o}{0.33V_i} = \frac{1+0j}{1+j\omega RC}$

$\Delta\theta = 0^\circ - \tan^{-1}\frac{\omega RC}{1}$

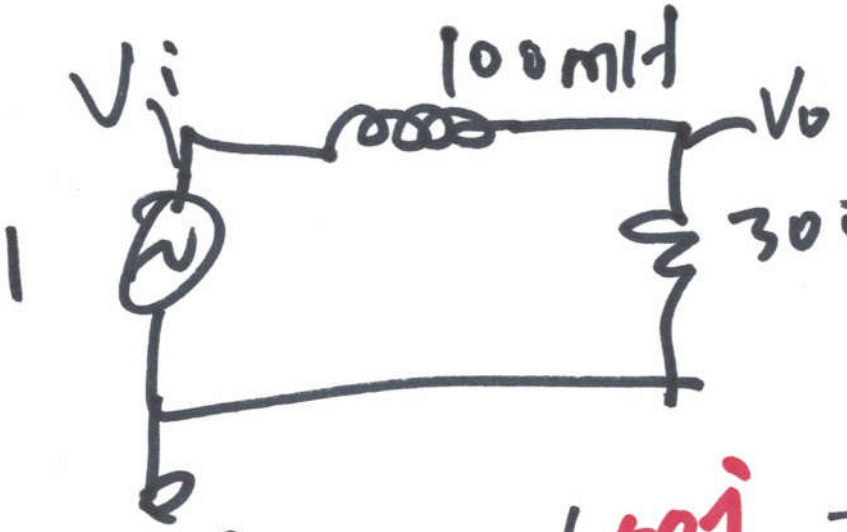
$= -\tan^{-1} 3 = -71^\circ$

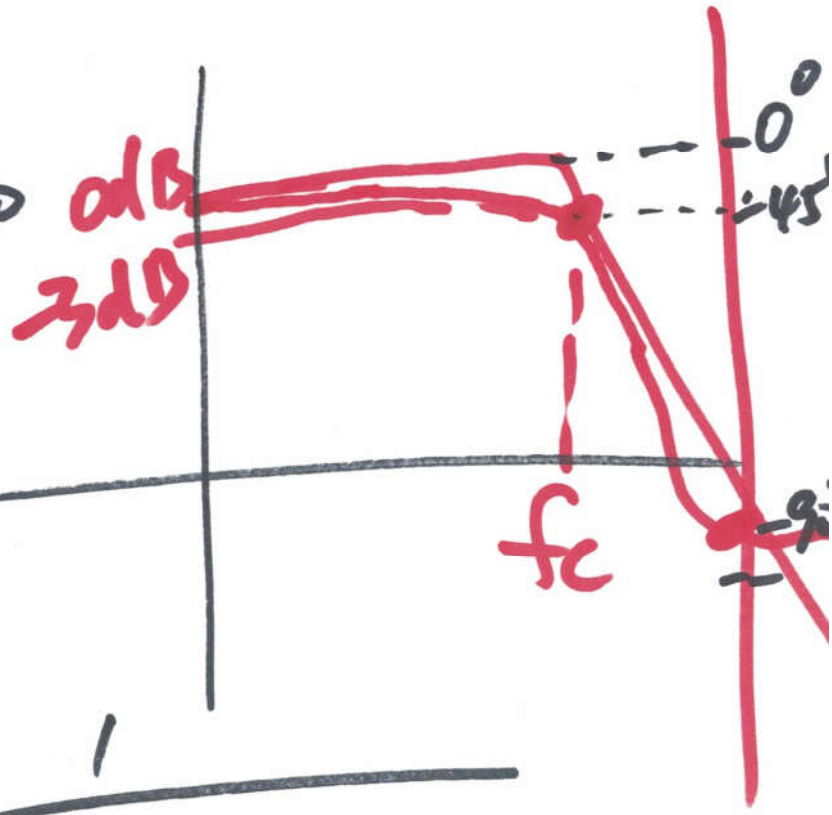
$\frac{1}{100k} = \frac{1}{0.1} \cdot 10^{-6} = 10\mu s$



$t_d = \frac{70^\circ}{360^\circ} \cdot \frac{1}{5} = 0.2 \cdot 10\mu = 2\mu s$

(2)





$$\frac{V_o}{V_i} = \frac{R}{R + j\omega L} = \frac{1}{1 + j\omega \frac{L}{R}}$$

$$\left|\frac{V_o}{V_i}\right| = \frac{1}{\sqrt{1^2 + \left(\omega \frac{L}{R}\right)^2}} = \frac{1}{\sqrt{1^2 + \left(2\pi f \frac{L}{R}\right)^2}}$$

$$= \frac{1}{\sqrt{1^2 + \left(\frac{f}{1/2\pi\frac{L}{R}}\right)^2}}$$

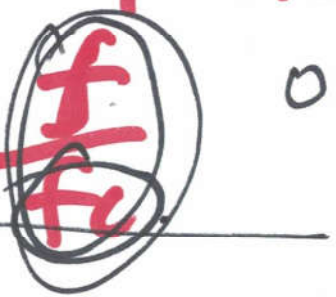
$$f_c = \frac{1}{2\pi \frac{L}{R}}$$

Phase:

$$\Delta\theta = \angle V_o - \angle V_i = 0 - \tan^{-1}\omega\frac{1}{\omega_c}$$

$$= -\tan^{-1}\frac{f}{1/2\pi f_c}$$

$$= -\tan^{-1}\frac{f}{f_c}$$



if $f \ll f_c$, $\Delta\theta = 0^\circ$

if $f = f_c$, $\Delta\theta = -45^\circ$

if $f \gg f_c$, $\Delta\theta = -90^\circ$

(4)