

Resolução do 1º Miniteste de Electrónica I (TEC e APEL)
2002/2003

a)

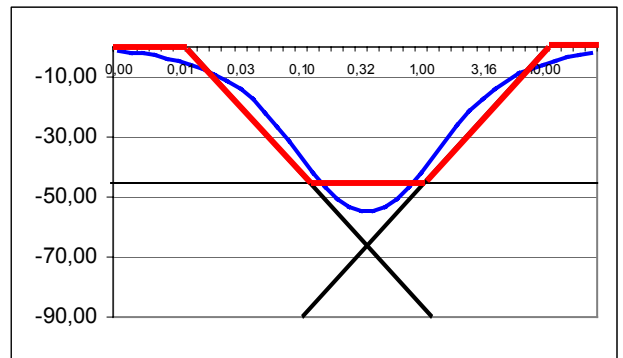
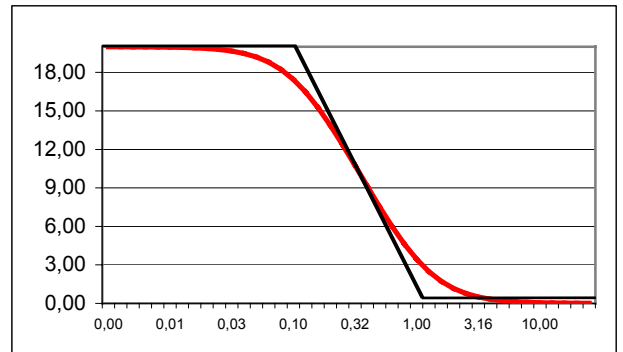
$$\frac{v_o}{v_s} = \frac{1k + \frac{9k}{1+s \cdot 9\mu}}{1k} = 10 \frac{1+s \cdot 0.9\mu}{1+s \cdot 9\mu}$$

$$\tau_z = 0.9\mu \Rightarrow \omega_z = 1.1 \cdot 10^6 \text{ rad/s}$$

$$\tau_p = 9\mu \Rightarrow \omega_p = 0.11 \cdot 10^6 \text{ rad/s}$$

$$|A(j\omega)| = 20\text{dB} + 10 \text{Log} \left(\frac{1 + (\omega \cdot 0.9\mu)^2}{1 + (\omega \cdot 9\mu)^2} \right)$$

$$\angle A(j\omega) = \text{atan}(\omega \cdot 0.9\mu) - \text{atan}(\omega \cdot 9\mu)$$



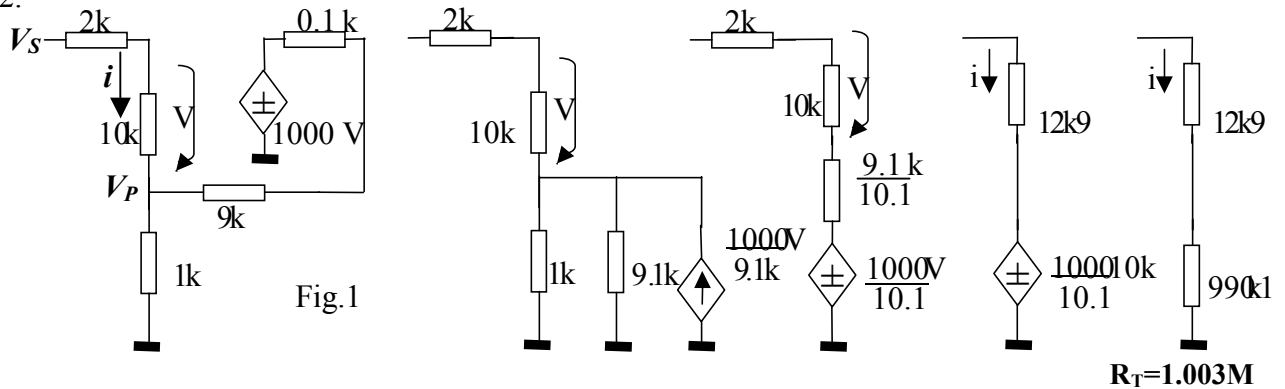
b)

$$V_{OV} = V_{OS} \cdot 10 = \pm 100\text{mV}$$

$$V_{OI} = \left(10\mu - \frac{2k \cdot 10\mu}{1k} \right) 9k - 2k \cdot 10\mu = -110\text{mV}$$

$$V_{OR} = \begin{cases} -10\text{mV} \\ -210\text{mV} \end{cases}$$

2.



Outra maneira de resolver: Atente-se na Fig.1 em que $V_P = V_S - 12k \cdot i$ e $V = 10k \cdot i$

$$i = \frac{v_s - 12k \cdot i}{1k} + \frac{v_s - 12k \cdot i - 1000 \cdot 10k \cdot i}{9k1}$$

$$9k1 \cdot i = 9.1 \cdot v_s - 9k1 \cdot 12 \cdot i + v_s - 10012k \cdot i$$

$$i(9.1 + 9.1 \cdot 12 + 10012)k = 10.1 \cdot v_s$$

$$R_i = \frac{v_s}{i} = \frac{10130.3k}{10.1} = 1003k$$