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

a)

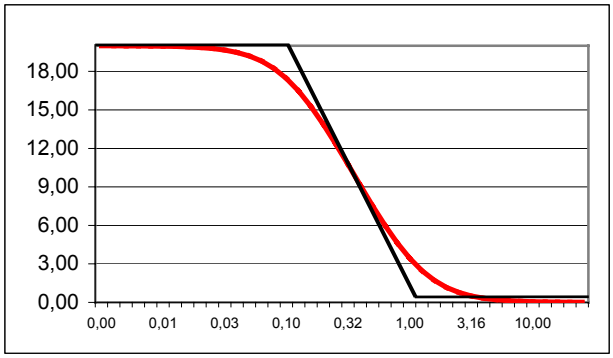
$$\frac{v_o}{v_s} = \frac{1k + \dfrac{9k}{1 + s\ 9\mu}}{1k} = 10\,\frac{1 + s\ 0.9\mu}{1 + s\ 9\mu}$$

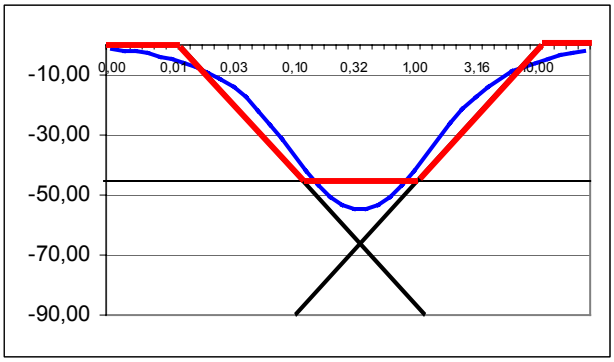
$$\tau_z = 0.9\mu \Rightarrow \omega_z = 1.1 \cdot 10^6\, rad/s$$

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

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

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





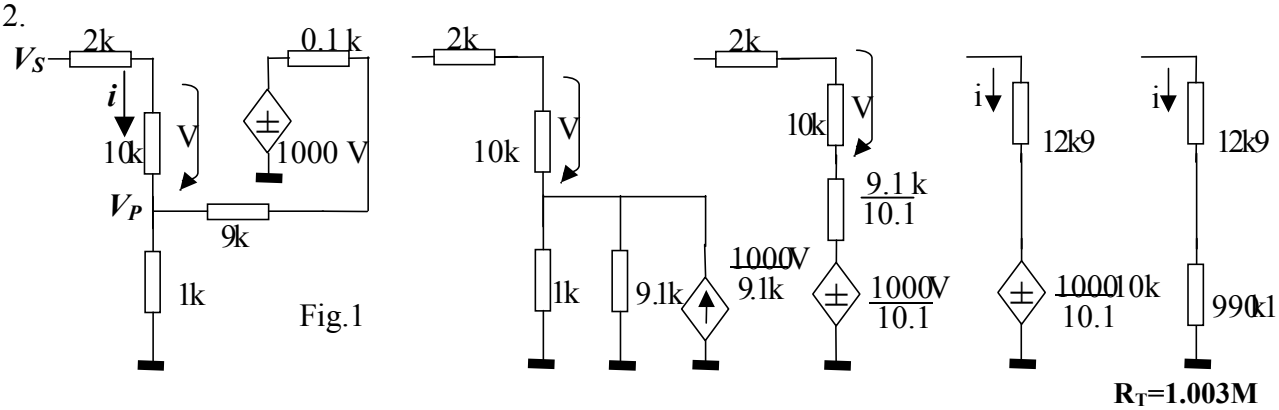
b)

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

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

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

2.



R_T=1.003M

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

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

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

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

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