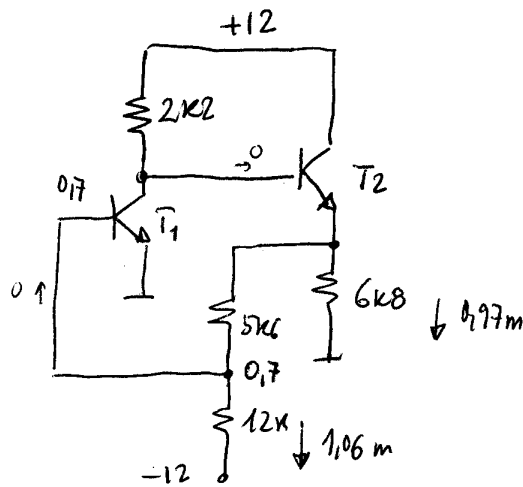


Resolução (compacta):

a)



$$V_{E2} = 0,7 + 5k\Omega \cdot 1,06m = 6,63V$$

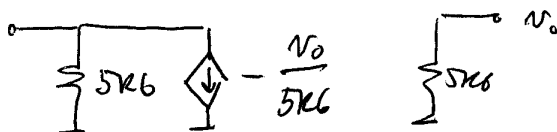
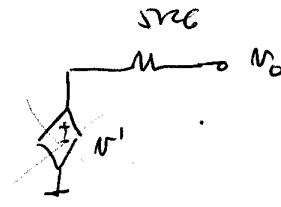
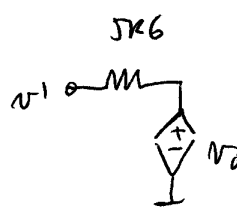
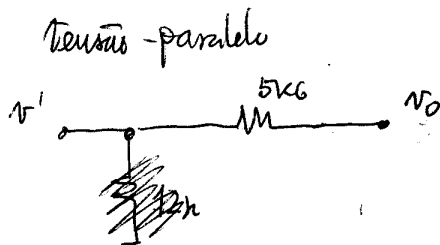
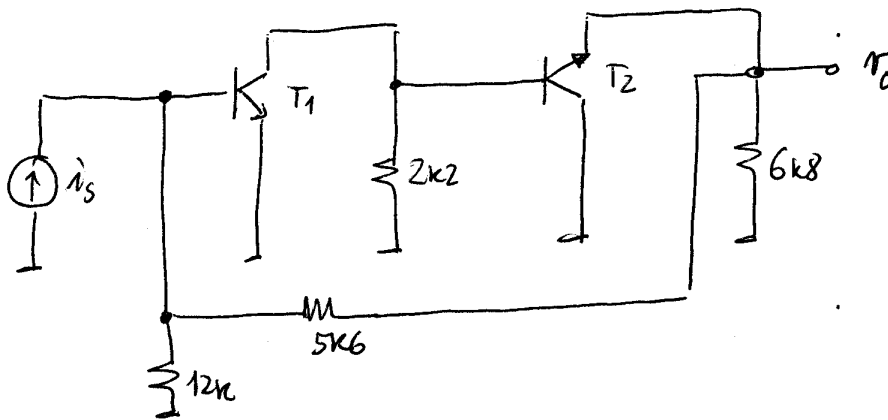
$$I_2 = 2,03mA \quad \textcircled{2}$$

$$V_{C1} \equiv V_{B2} = 7,33V$$

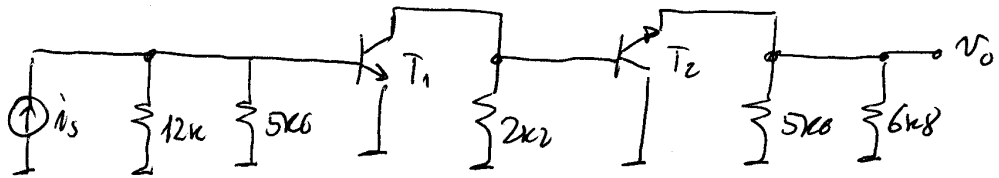
$$I_1 = 2,12mA$$

- |                  |                  |
|------------------|------------------|
| $V_{C1} = 7,33V$ | $V_{C2} = 12V$   |
| $V_{B1} = 0,7V$  | $V_{B2} = 7,33V$ |
| $V_{E1} = 0$     | $V_{E2} = 6,63V$ |

b)

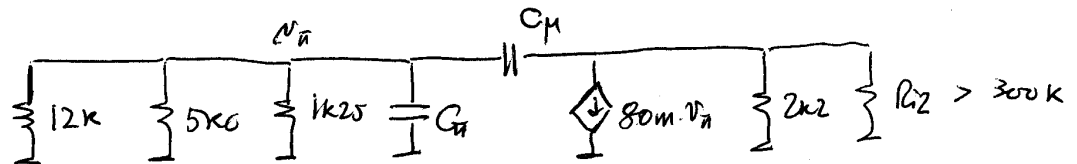


$$\beta = -\frac{1}{5k\Omega} \text{ A/V}$$



c)  $T_2$  é um CC pelo que tem resposta muito boa, i.e., a contribuição das suas capacidades é mto. pequena — uma está demais à massa ( $C_{\pi}$ ) e a outra ( $C_{\mu}$ ) tem reduzido efeito de Miller.

$T_1$  é um EC de elevado ganho logo há efeito de Miller (sobre a o nó da base) considerável.



$$K = -80m \times 2k2 = -176$$

$$C = C_{\pi} + 177 C_{\mu} = 50p + 177p = 227pF$$

$$\tau = (12k \parallel 5k6 \parallel 1k25) 227p \approx 214 \text{ ns}$$

d)  $\beta A = 30$

$$A_2 \approx 1 \quad \text{pois} \quad A_2 = \frac{3k07}{125 + 3k07} \approx 1, \quad R_{i2} > 300k$$

$$A_1 = -80m \cdot 2k2 (12k \parallel 5k6 \parallel 1k25) =$$

$$R_m \approx -165,7 \text{ V/mA} \quad \text{①}$$

$$R_{mf} = \frac{R_m}{1 + \beta R_m} = - \frac{165,7 \cdot 10^3}{31} = -5,35 \text{ V/mA}$$

$$R_o = 5k6 \parallel 6k8 \parallel \frac{2k2 + 1k25}{101} = 33,8 \Omega$$

$$R_{of} = \frac{R_o}{1 + \beta R_m} = 1,09 \Omega$$