

Tarea 5

Angie Marchena Mondell

16.

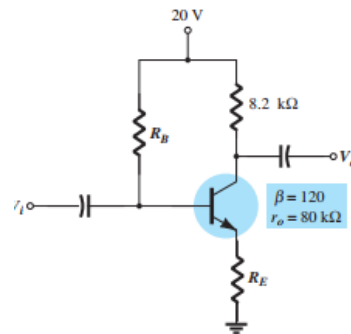


FIG. 5.157
Problema 16.

#16

• $A_v = \frac{\beta R_C}{Z_b} = -\frac{\beta R_C}{\beta R_E} = -\frac{R_C}{R_E} = -10$

$\Rightarrow R_E = \frac{R_C}{10} = \frac{8.2 \text{ k}\Omega}{10} = 0.82 \text{ k}\Omega$

$I_E = \frac{26 \text{ mV}}{r_e} = \frac{26 \text{ mV}}{3.8 \Omega} \Rightarrow 6.842 \text{ mA}$

$V_F = I_E R_E$
 $(6.842 \text{ mA} \cdot 0.82 \text{ k}\Omega)$
 $= 5.61 \text{ V}$

$V_B = V_F + V_{BE}$
 $5.61 \text{ V} + 0.7 = 6.31 \text{ V}$

$I_B = I_E$
 $(\beta + 1)$
 $= \frac{6.842 \text{ mA}}{121} \Rightarrow 56.55 \mu\text{A}$

$V_{R_B} = \frac{V_{CC} - V_B}{I_B}$
 $= \frac{20 \text{ V} - 6.31 \text{ V}}{56.55 \mu\text{A}} = 242.09 \text{ k}\Omega$

Tarea 5

17.

17 #17

a) $r_c = 5,34 \Omega$ (#15)

b) $Z = R_B // Z_b$
 $Z_b = R_B // \beta r_c$
 $= 390 k\Omega // (140 \cdot 5,34 \Omega)$
 $\boxed{Z_b = 746,17 \Omega}$
 $Z_o = R_c = 2,2 k\Omega$

c) $A_v = \frac{-R_c}{r_c} = \frac{-2,2 k\Omega}{5,34 \Omega}$
 $\boxed{A_v = -411,99}$

d) $Z_i = 746,17 \Omega$
 $Z_o = R_c // r_o$
 $= \frac{2,2 k\Omega \cdot 20 k\Omega}{2,2 k\Omega + 20 k\Omega} = \boxed{1,98 k\Omega}$

$A_v = \frac{R_c // r_o}{r_c}$
 $= \frac{1,98 k\Omega}{5,34 \Omega} = \boxed{-370,79}$

18.

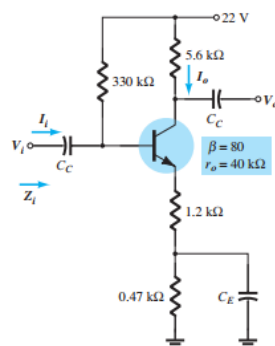


FIG. 5.158
Problema 18.

Tarea 5

#18

$$a) I_B = \frac{V_{CC} - V_{BE}}{R_B + (B+1)R_E}$$

$$= \frac{22V - 0,7}{330k\Omega + (81)(1,2k\Omega + 0,47k\Omega)}$$

$$= 45,78 \mu A$$

b $r_o < 10(R_C + R_E)$

$$Z_b = \beta R_E + \left[\frac{(B+1) + R_C/r_o}{1 + (R_C + R_E)/r_o} \right] R_E$$

$$= (80 \cdot 7\Omega) + \left[\frac{81 + 5,6k/40k\Omega}{1 + (6,8k)/40k\Omega} \right] \cdot 1,2k\Omega$$

$$= 560\Omega + \left[\frac{81 + 0,14}{1 + 0,17} \right] \cdot 1,2k\Omega$$

$$= 560\Omega + [81,14/1,17] \cdot 1,2k$$

$$= 87,78k\Omega$$

$$Z_i = R_B // Z_b$$

$$= \frac{330k \cdot 87,78k}{330k + 87,78k}$$

$$= 66,82k\Omega$$

$$A_v = \frac{-\beta R_C}{Z_b} \cdot \left(\frac{1 + r_c}{r_o} \right) + \frac{R_C}{r_o}$$

$$= \frac{1 + R_C}{r_o}$$

$$\Rightarrow \frac{-80 \cdot 5,6k\Omega}{87,78k\Omega} \cdot \left(\frac{1 + 7\Omega}{40k\Omega} \right) + \frac{5,6k\Omega}{40k\Omega}$$

$$= \frac{-5,35 + 0,14}{1 + 0,17}$$

$$= -4,57$$

Tarea 5

22.

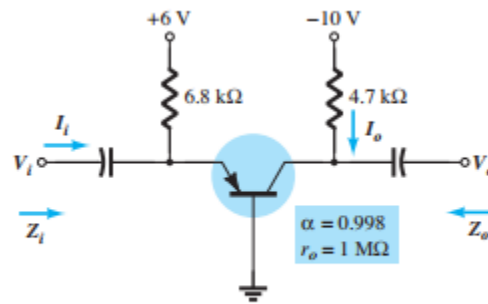


FIG. 5.162
Problema 22.

#22

a) $I_E = \frac{V_{EE} - V_{BE}}{R_E}$
 $= \frac{6V - 0.7V}{6.8k\Omega} = 0.779mA$

$V_E = -26mV$
 $I_E = \frac{26mV}{0.779mA} = 33.38\Omega$

b) $Z_i = R_E \parallel r_e$
 $= \frac{6.8k\Omega \cdot 33.38\Omega}{6.8k\Omega + 33.38\Omega} = 33.22\Omega$

c) $Z_o = R_C = 4.7k\Omega$
 $A_v = \frac{\alpha R_C}{r_e} = \frac{0.998 \cdot 4.7k\Omega}{33.38\Omega} = 140.52$