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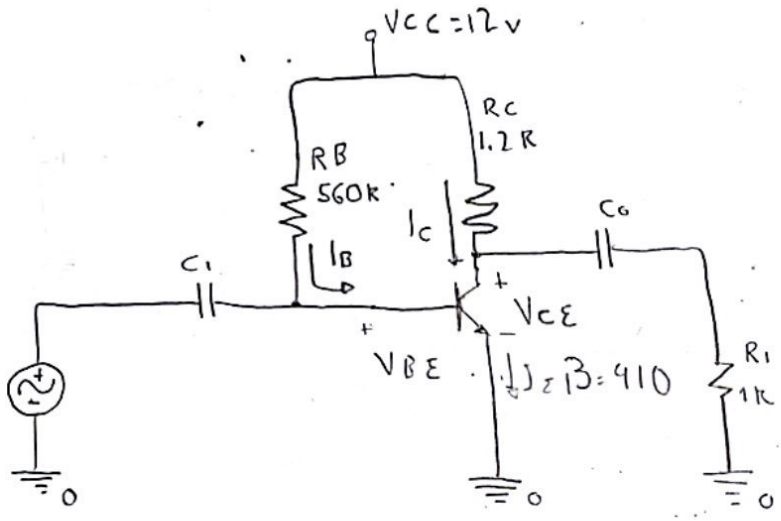
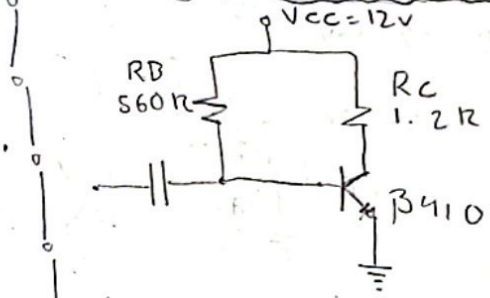
Tarea 1.11: Circuito de polarización fija y circuito de polarización estabilizado en emisor

1- Calcular I_B, I_C y V_{CE} para el siguiente circuito



Análisis de malla B - E



$V_{BE} = 0.7\,v$

$I_B = \dfrac{V_{cc} - V_{BE}}{R_B}$

$I_B = \dfrac{12v - 0.7v}{560K}$

$I_B = 2.01785 \times 10^{-5}\,A$

$I_C = \beta I_B$

$= (410)(2.01785 \times 10^{-5})$

$I_C = 8.273214 \times 10^{-3}\,A$

$V_{CE} = V_{CC} - I_C R_C$

$= 12_v - (8.2732)(1200)$

$= 12 - 9.9278$

$V_{CE} = 2.07214285\,v$

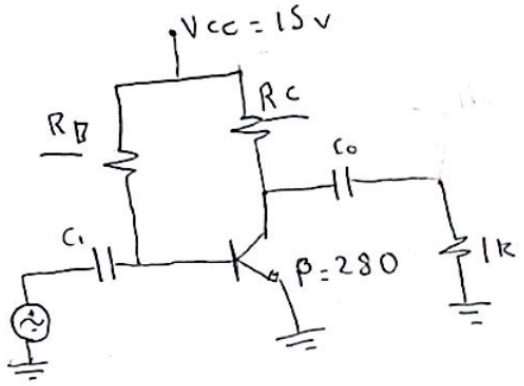
2. Con las siguientes datos, calcular I_B, R_B, y R_C en el circuito de polarización fija

Q (3 mA, 6 v)

$V_{CC} = 15\,v$

$\beta = 280$

Q(3 mA, 6 v)



$I_c = 3\,mA$

$V_{CE} = 6\,v$

$V_{CE} = V_{cc} - I_c R_c$

$V_{CE} - V_{cc} = -I_c R_c$

$R_c = \frac{V_{cc} - V_{CE}}{I_c}$

$R_c = \frac{15 - 6}{3\,mA}$

$R_c = 3k\Omega$

$I_B = \frac{V_{cc} - V_{BE}}{R_B}$

$R_B = \frac{V_{cc} - V_{BE}}{I_B}$

$\beta = \frac{I_c}{I_B}$

$I_B = \frac{I_c}{\beta}$

$I_B = \frac{3\,mA}{280}$

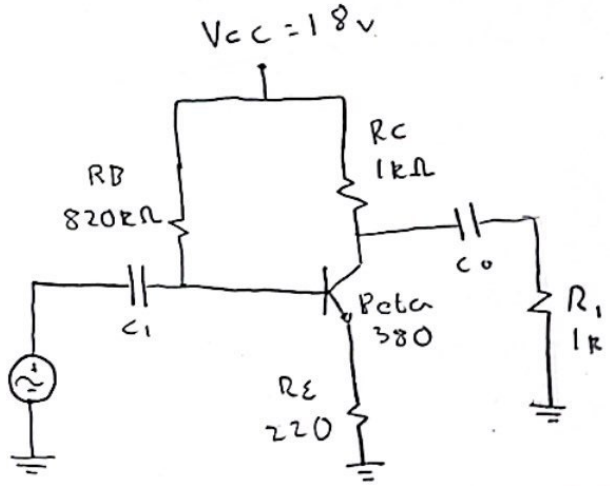
$I_B = 10.714\,mA$

$R_B = \frac{15 - 0.7}{10.714}$

$= 133.4666\,k\Omega$

$R_B \simeq 150k\Omega$

3) Calcular $I_B, I_c, V_{CE}, V_E, V_c$ y V_B del siguiente circuito



$I_B = \frac{V_{cc} - V_{BE}}{R_B + (\beta + 1)R_E} = \frac{18 - 0.7}{820k + (380+1)220}$

$I_B = 19.1409\,mA$

$I_c = \beta I_B = 380(19.1409\,mA)$

$I_c = 7.2735\,mA$

$V_{CE} = V_{cc} - I_c(R_c + R_E)$

$= 18 - [7.2735 \times 10^{-3}(1000 + 220)]$

$= 18 - 8.8737\,v$

$V_{CE} = 9.126241\,v$

Q(7.2735 mA, 9.1262 v)

$V_B = V_{RB}$

$V_B = I_B R_B$

$V_B = (19.1409\,\mu A)(820\,k\Omega)$

$\boxed{V_B = 15.6956\,V}$

$V_{BE} = V_B - V_E = 0.7\,V$

$V_E = V_B - 0.7\,V$

$V_E = 15.6956 - 0.7$

$\boxed{V_E = 14.9955\,V}$

$V_C = V_{RC}$

$V_C = I_C R_C$

$V_C = (7.2735\,mA)(1000)$

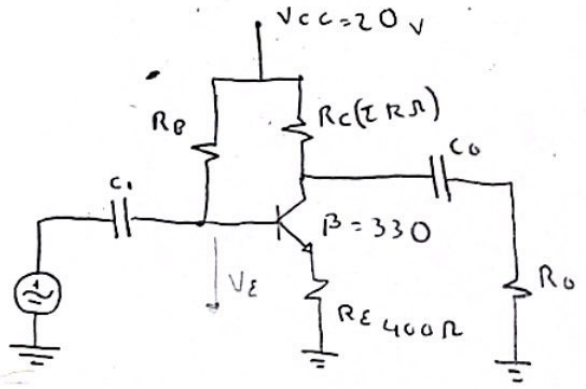
$\boxed{V_C = 7.2735\,V}$

4) Con los siguientes datos, calcula I_B; R_C y R_E en el circuito de polarización estabilizado en Emisor

Q(5.2mA, 8V)

$V_{CC} = 20\,V$

$\beta = 330$



$I_C = 5.2\,mA$ $V_{CE} = 8\,V$

$I_E \cong I_C$

$I_E = 5.2\,mA$

$V_E = \frac{1}{10} \cdot 20\,V = 2\,V$

$V_E = V_{RE} = I_E R_E$

$R_E = \frac{V_E}{I_C} = \frac{2}{5.2\,mA}$

$\boxed{R_E = 384.6153\,\Omega}$

$\boxed{R_E \cong 400\,\Omega}$

$V_{CE} = V_{CC} - I_C(R_C + R_E)$

$I_C(R_C + R_E) = V_{CC} - V_{CE}$

$R_C + R_E = \frac{V_{CC} - V_{CC}}{I_C}$

$R_C = \frac{V_{CC} - V_{CE}}{I_C} - R_E$

$R_C = \frac{20\,V - 8\,V}{5.2\,mA} - 384.6153\,\Omega$

$\boxed{R_C = 1923.0769\,\Omega}$

$\boxed{R_C \cong 2\,k\Omega}$

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

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

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

$$I_B = \frac{I_C}{\beta}$$

$$I_B = \frac{5.2mA}{330}$$

$$\boxed{I_B = 66.66\mu A}$$

$$R_B = \frac{20 - 0.7}{66.66\,\mu A} - (330+1)(384.6153)$$

$$= 2895000 - (330+1)(384.6153)$$

$$\boxed{R_B = 2,767,692.336\,\Omega}$$

$$\boxed{R_B \simeq 3M\Omega}$$