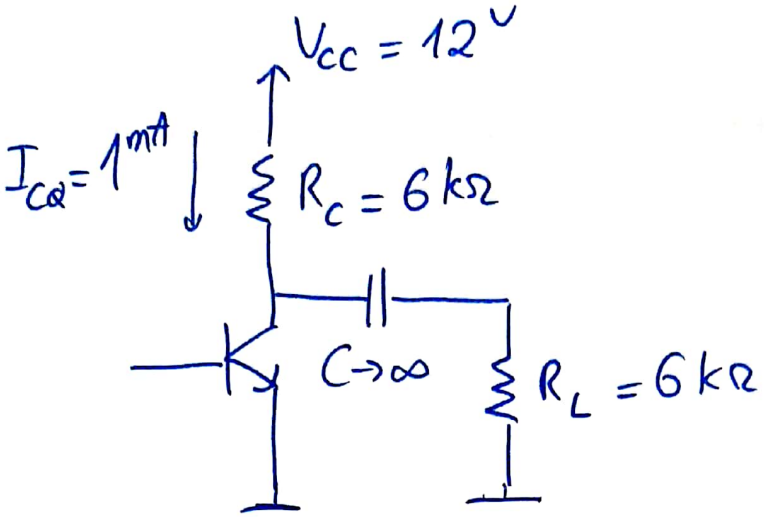
Analog Electronics

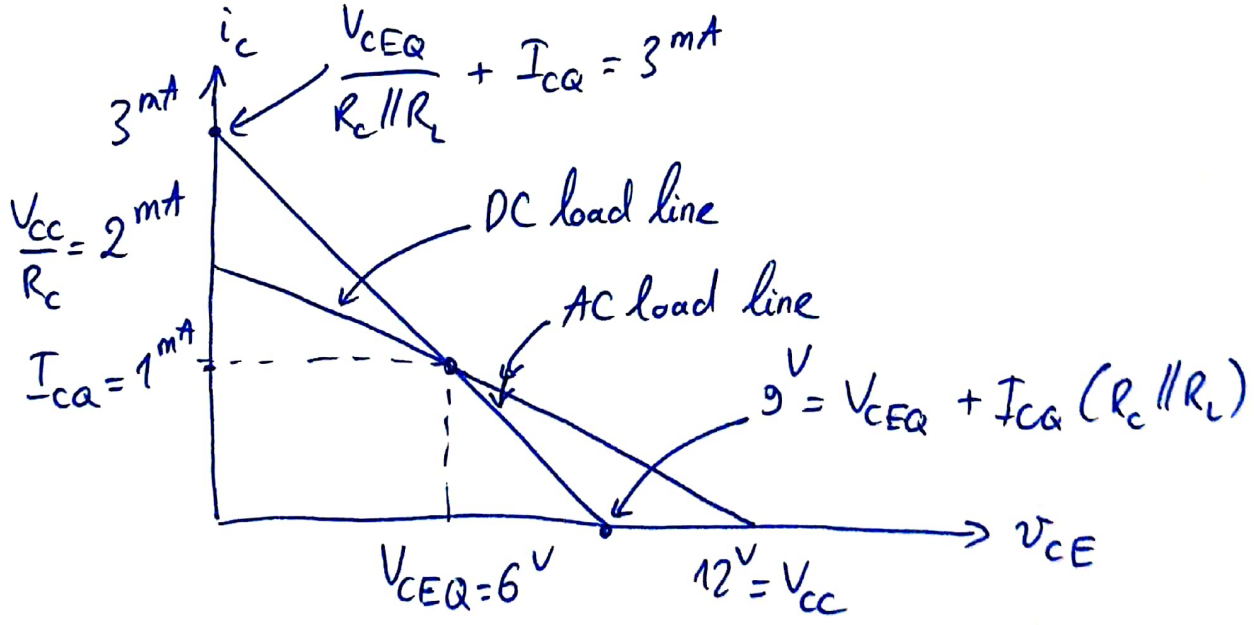
QUIZ #6

(1)

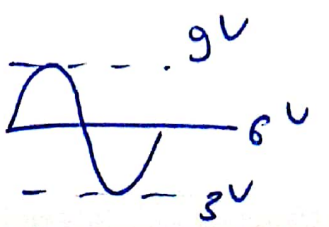


a) • DC load line: $i_c = \dfrac{V_{CC} - v_{CE}}{R_c}$

• AC load line: $i_c = \dfrac{V_{CEQ}}{R_c // R_L} + I_{CQ} - \dfrac{v_{CE}}{R_c // R_L}$

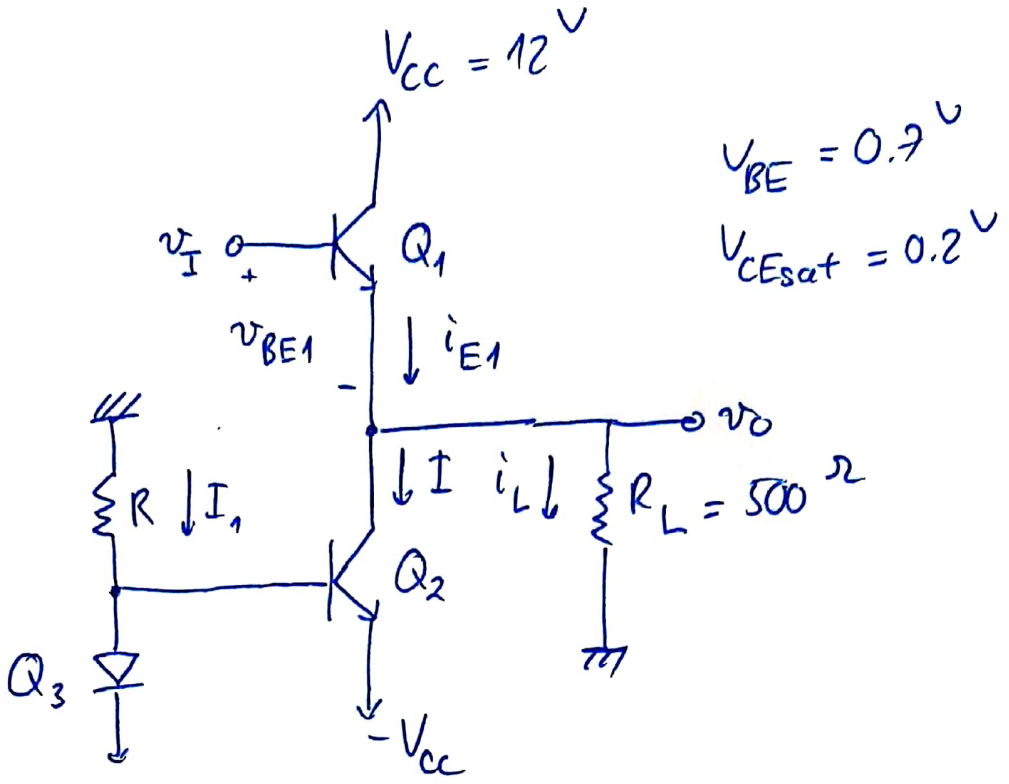


b) Swing of v_o



$V_{peak} = 3^V$

(2)



a) $I = \dfrac{|-V_{CC} + V_{CE2\,sat}|}{R_L} = \dfrac{|-12 + 0.2|}{500} = 23.6^{mA}$

$R = \dfrac{0 - (-V_{CC} + V_{BE2})}{I_1} = \dfrac{V_{CC} - V_{BE2}}{I} = \dfrac{12 - 0.7}{23.6^m} = 478.8\,\Omega$

b) $v_{op} = V_{CC} - V_{CE1sat} = 12 - 0.2 = 11.8^V$

$P_L = \dfrac{V_{op}^2}{2R_L} = \dfrac{11.8^2}{2 \times 500} = 139\ mW$

c) $v_o \in [-V_{CC} + V_{CE2\,sat},\ V_{CC} - V_{CE1sat}]$

$\Rightarrow v_o \in [-11.8^V, 11.8^V]$

$v_i = v_o + V_{BE1} \Rightarrow v_I \in [-11.1^V, 12.5^V]$

- At $v_{I\,min} = -11.1^V$, $i_{E_1} = 0^A$
- At $v_{I\,max} = 12.5^V$, $i_{E_1} = 2I = 47.2^{mA}$

d) No. Because there are no capacitors in the circuit.