Homework 7, Due Date (Tuesday, March 19th 2013, In Class)

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Problem 6.13

Assume that $\beta = 100$, $V_A = \infty$, $R_1 = 33\ \text{k}\Omega$, and $R_2 = 50\ \text{k}\Omega$ for the circuit in Figure P6.13. (a) Plot the *Q*-point on the dc load line. (b) Determine the small-signal voltage gain. (c) Determine the range in voltage gain if R_1 and R_2 vary by ± 5 percent.

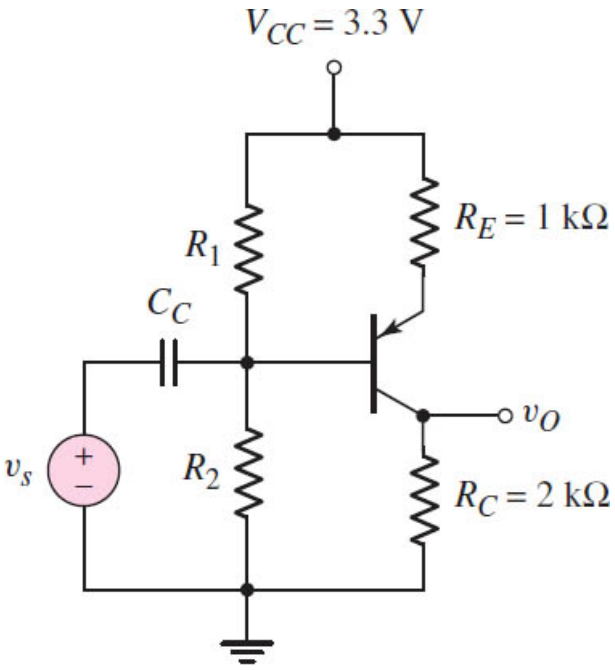

Figure P6.13

Problem 6.19

Consider the circuit shown in Figure P6.19 where the signal-source is $\upsilon_s = 4\sin\omega t$ mV. (a) For transistor parameters of $\beta = 80$ and $V_A = \infty$, (i) find the small-signal voltage gain $A_\upsilon = \upsilon_o/\upsilon_s$ and the transconductance function $G_f = i_o/\upsilon_s$, and (ii) calculate $\upsilon_o(t)$ and $i_o(t)$. (b) Repeat part (a) for $\beta = 120$.

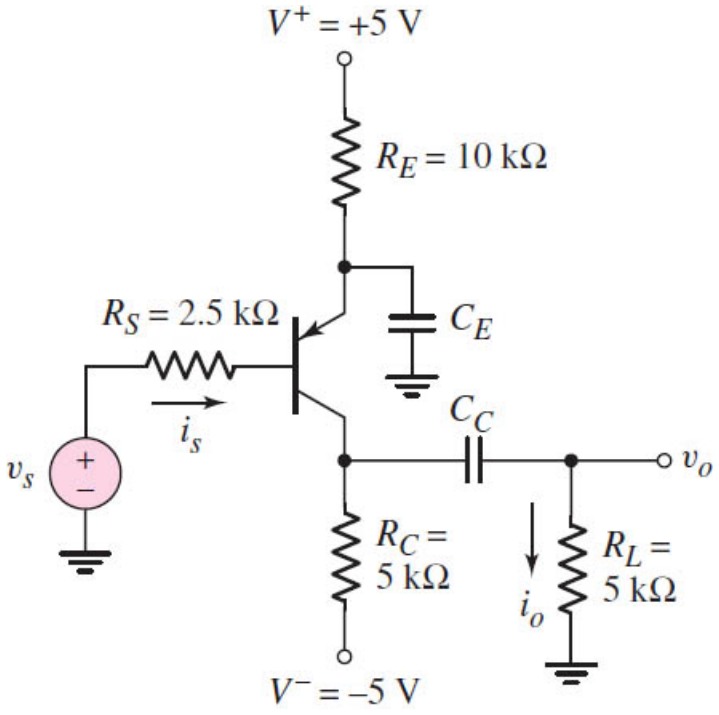

Figure P6.19

Problem 6.35

The parameters of the circuit shown in Figure P6.17 are $R_B = 20\ \text{k}\Omega$ and $R_C = 2.5\ \text{k}\Omega$. The transistor parameters are $\beta = 80$ and $V_A = \infty$. Determine the maximum undistorted swing in the output current i_o if the total instantaneous collector current is to be $i_C \geq 0.08$ mA and the total instantaneous E-C voltage is to be in the range $1 \leq \upsilon_{EC} \leq 9$ V.

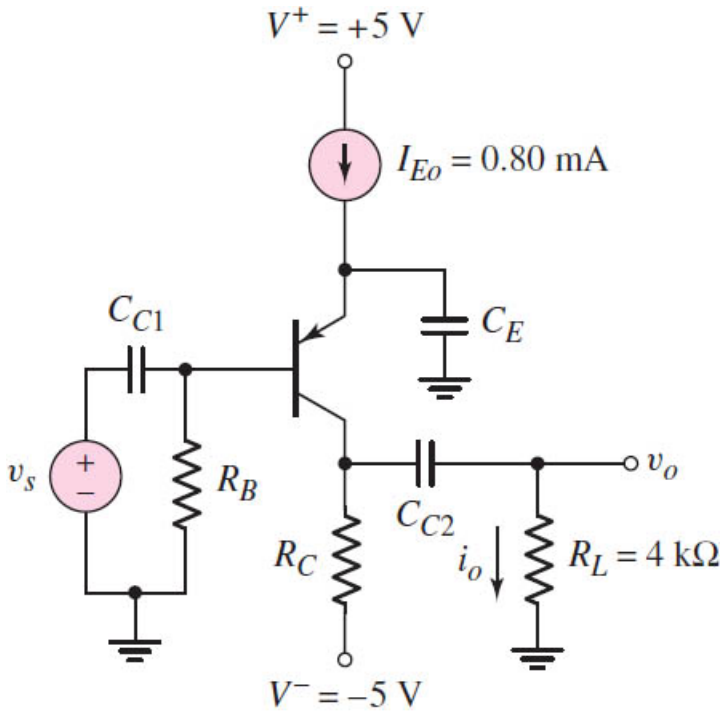

Figure P6.17

Problem 6.45

Consider the circuit in Figure P6.45. The transistor parameters are $\beta = 120$ and $V_A = \infty$. Repeat parts (a)–(d) of Problem 6.44.

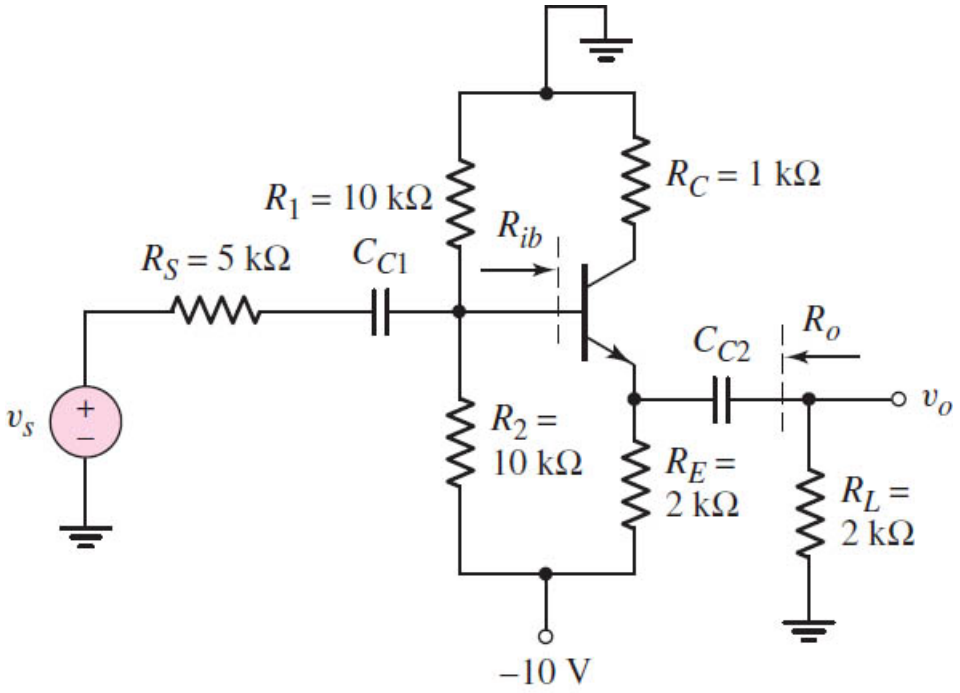

Figure P6.45

Problem 6.51

In the circuit shown in Figure P6.51, determine the range in small-signal voltage gain $A_v = v_o/v_s$ and current gain $A_i = i_o/i_s$ if β is in the range $75 \leq \beta \leq 150$.

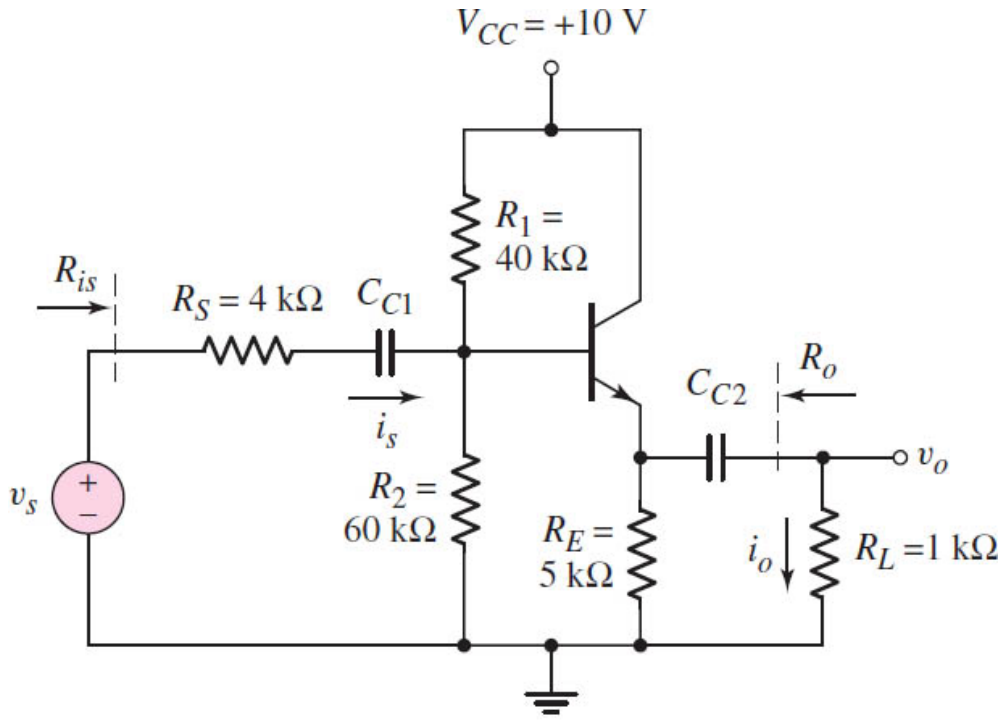

Figure P6.51