ECE 2100 homework # 19 Due: Wed, 4/2/03

A.Stolp
4/1/03

1. For the circuit shown at right, you may neglect I_B and r_o, and assume the coupling and bypass capacitors a adequately sized, Find:

   a) The DC bias values, V_B, V_E, I_E, & V_C.

   b) The power dissipated in the transistor P_Q.

   c) The input resistance R_{in} .

   d) The output resistance R_o .

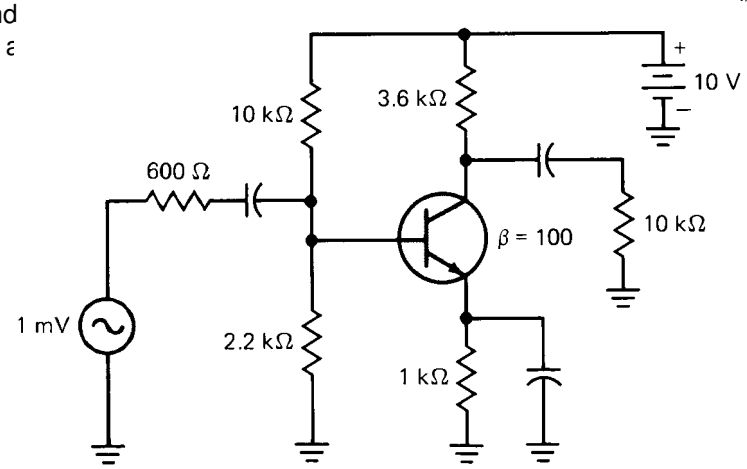
   e) The signal voltage across R_L . $v_S := 1 \cdot mVpp$

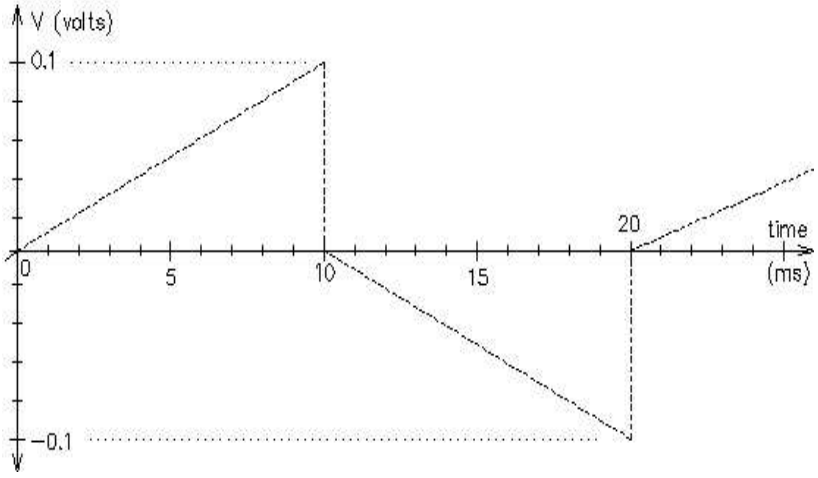
   f) The maximum peak-to-peak output signal without clipping (V_{oppmax}).

   g) Find values for the two coupling capacitors such that each produces a low frequency roll-off at 10 Hz (f_{CL} for each is 10 Hz)

   h) Find a value for the emitter bypass capacitor such that it produces a low frequency roll-off at 15 Hz (f_{CL} = 15 Hz).

   i) The input to the circuit is changed to the waveform shown. Draw the output waveform showing all important voltages. Watch for clipping. Use the clipping levels that you found in part f).





The following exercises are from the book
Ex4.10, page 241 After temp increase, v_{BE} = ?
Ex4.11, page 241
Ex4.22, page 258
Ex4.28 - Ex4.30, page 280 - 282 In the second part of 4.30, you are creating the current source used in the bias of the first part.

ECE 2100 homework # 20 Due: Mon, 4/7/03

Ex4.45, Ex4.46,
Problems 4.120, 4.119
The transistor of HW 19, problem 1 has C_π = 11pF, C_μ = 2pF & 1pF of stray capacitance between the base & collector, find f_{CH} due to these.

Answers

1 a) $V_B := 1.8 \cdot V$ $V_E := 1.1 \cdot V$ $I_E := 1.1 \cdot mA$ $V_C := 6.03 \cdot V$

b) $P_Q := 5.4 \cdot mW$ c) $R_{in} := 1 \cdot k\Omega$ d) $R_o := 3.6 \cdot k\Omega$

e) $v_L := 73.1 \cdot mV$ f) $V_{oppmax} := 5.8 \cdot V$

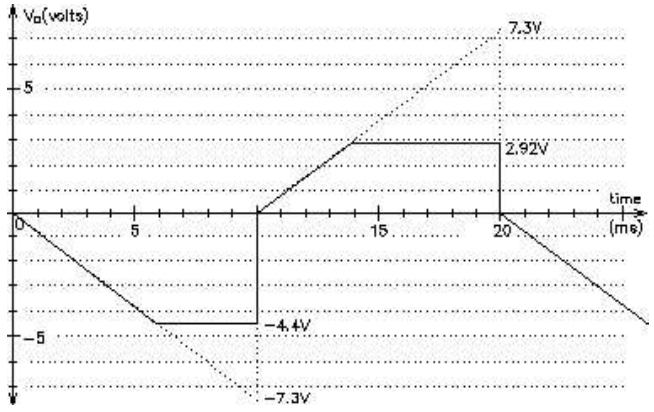
g) $C_{in} := 9.9 \cdot \mu F$ $C_o := 1.2 \cdot \mu F$ h) $C_E := 480 \cdot \mu F$

HW # 20

4.120 $r_o || \frac{r_\mu + r_\pi}{\beta + 1}$

last problem $1.82 \cdot MHz$

i)



ECE 2100 homework # 19 & 20