File: E:/courses/spring2008/303/hmwrk2.doc RWN 03/02/08

Homework Set 3 due Tuesday 03/11/08

1. [50 points] (npn parameters)
   a) For the 2N3904 set the Q-point IC=2mA and VCE=3V. Calculate IB. Calculate using the formulas of the book the grounded emitter low frequency admittance parameters $g\pi$, gm, go, and draw the small signal equivalent circuit adding in the base-emitter capacitance $C\pi$. Give the 2-port admittance matrix, Y(s).
   b) Run PSpice to get the IC versus VCE with IB as a parameter so that the Q-point is available. From these curves determine the low frequency Y matrix parameters and compare with those found in part a).
   c) Compare the results of a) and b) with those of a data sheet.

2. [50 points] (pnp parameters)
   a) Repeat problem 1 for the pnp transistor 2N3906

3. [50 points] (push pull operation)
   a) Connect the 2N3904 & 2N3906 in the push-pull configuration of Figure 14.5, p. 1236 using VCC=9V and RL=10Ohm. Do a DC run in PSpice to obtain a transfer curve similar to that of Figure 14.6.
   b) Use the pi-equivalent circuits and obtain the output resistance of the push-pull amplifier. Use the bias point found from part a) when the input voltage is zero (that is, at ground potential). Compare your results with those of the text.
   c) Use the circuit of Figure 14.14 where D1 is a diode connected QN and D2 is a diode connected QP and run PSpice to get a transfer curve; compare with that of part a).