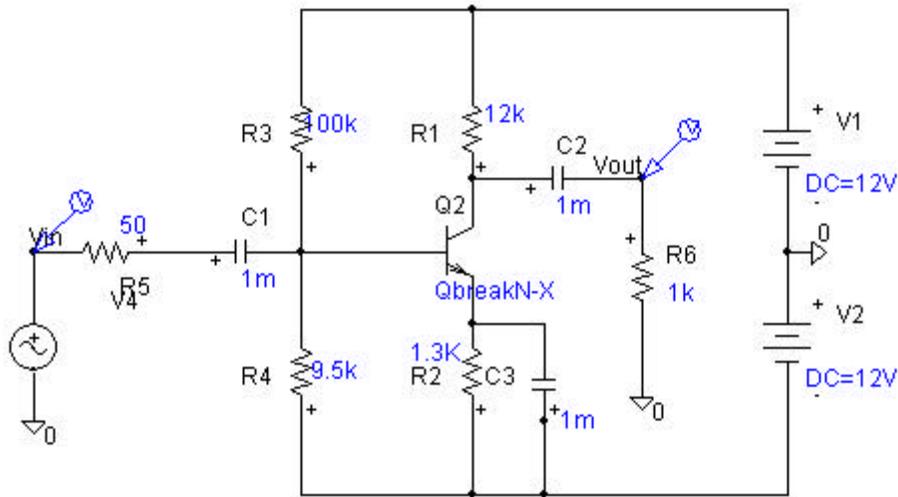


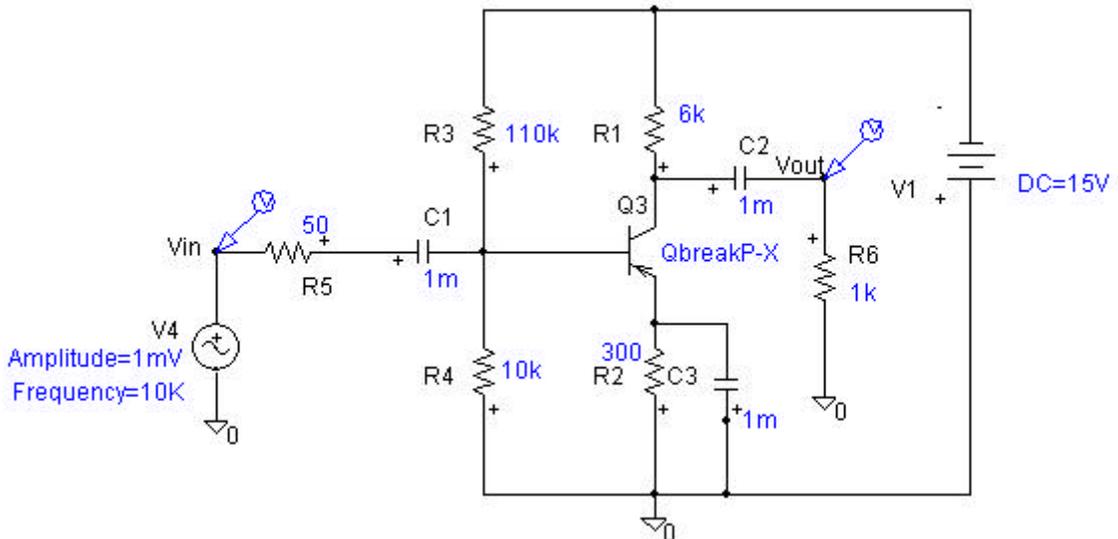
ECE 3040 Homework #6

For each of the following three circuits, verify the mode of operation of the following circuit is forward active. Determine the Q-point and all relevant small signal parameters. Determine the small signal AC voltage gain $A_v = V_{out}/V_{in}$. What is the “worst-case” maximum voltage swing of the output based on the Collector bias voltage. (NOTE: the actual output voltage swing of this circuit may be smaller due to large input signals driving the transistor out of active mode and into saturation.) You may want to simulate this with PSPICE to get a feel for the circuit operation. Assume $I_S = 1.83e-15$ A (for PSPICE) to get a turn on voltage for 1 mA current as 0.7 V and $\beta = 100$.

1.)



2.)



3.)

