EEE411/EEE511 LAB # 2
Bandwidth estimation
31 October 2008

Preliminary work:
Estimate the lower and upper cut-off frequencies of the circuits A and B using the methods of short-circuit time constants and open-circuit time constants, respectively. The output load is 150 pF in parallel with the input impedance of the 10x measurement scope probe. Derive the transistor input resistance and $g_m$ from the DC bias. You can neglect $r_o$ (the output impedance of the transistor). The base-emitter capacitance is 8 pF and the collector-base capacitance is 3.8 pF. The transistor data sheet is available at the course web page.

Circuit A
**Experimental work:**
Analyse circuits A to D by SPICE simulations. Use the spice model of BC237BP given below.

**Discussion:**
Explain how each additional circuit in steps from circuit A to D changes the BW of the circuit.

**BC237BP Spice Model:**
```
.MODEL BC237BP NPN(IS=1.8E-14 BF=400 NF=0.9955 VAF=80 IKF=0.14
+ ISE=5E-14 NE=1.46 BR=35.5 NR=1.005 VAR=12.5 IKR=0.03
+ ISC=1.72E-13 NC=1.27 RB=0.56 RE=0.6 RC=0.25
+ CJE=1.3E-11 TF=6.4E-10 CJC=4E-12 VJC=0.54 TR=5.072E-8)
```