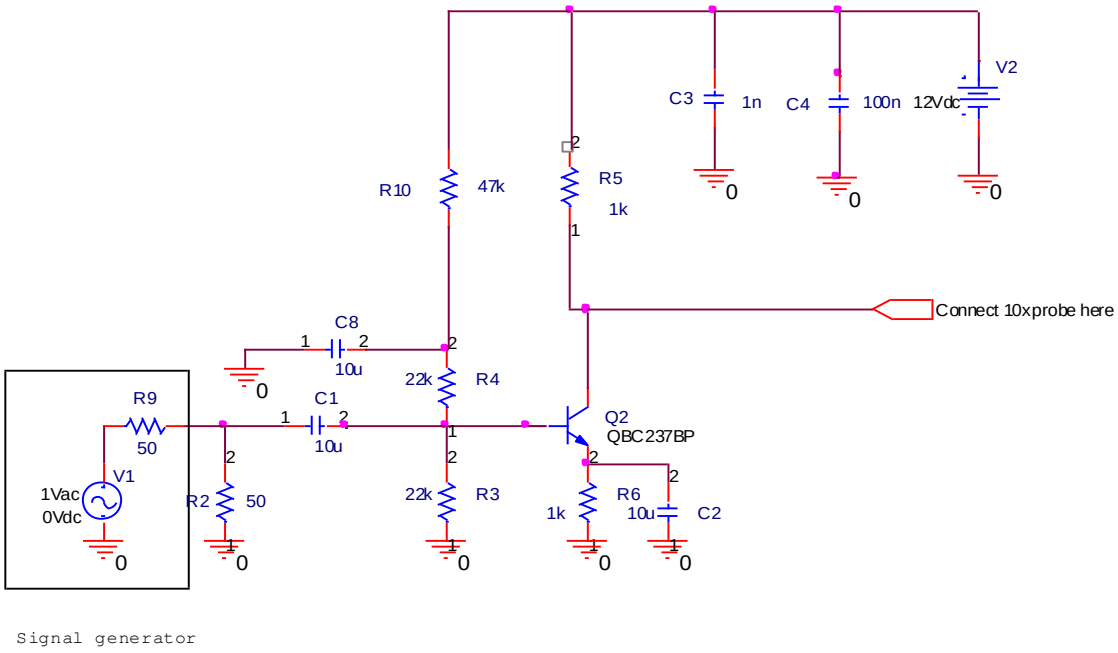
EEE411/EEE511 LAB # 2

Bandwidth estimation

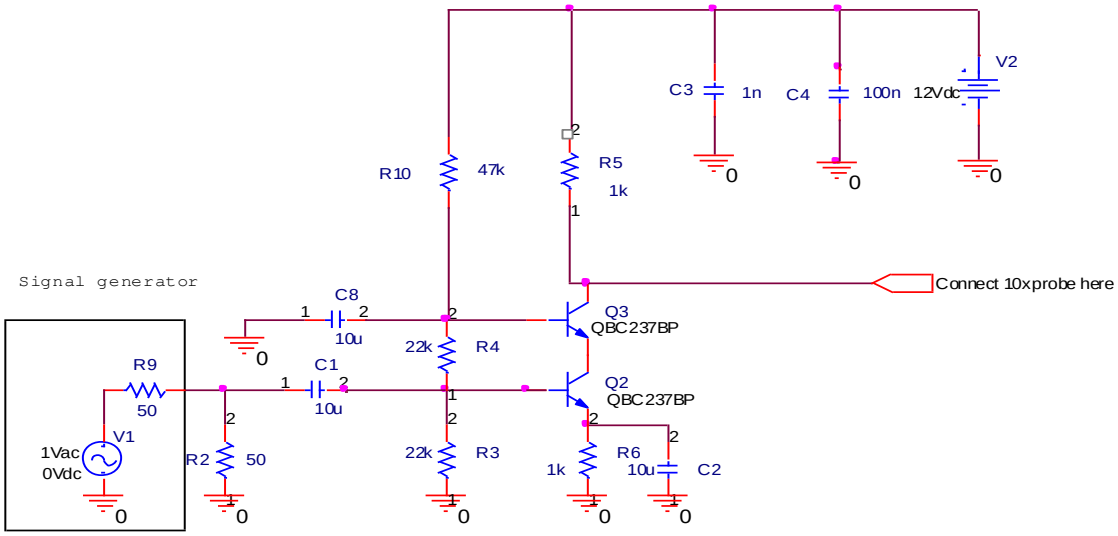
31 October 2008

Preliminary work:

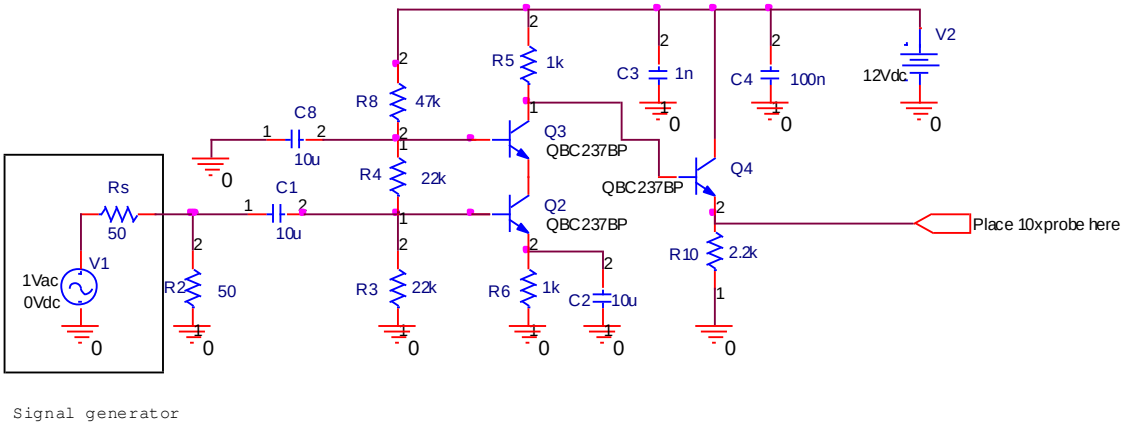
Estimate the lower and upper cut-off frequencies of the circuits A and B using the methods of short-circuit time constants and open-circuit time constants, respectively. The output load is 150 pF in parallel with the input impedance of the 10x measurement scope probe. Derive the transistor input resistance 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.



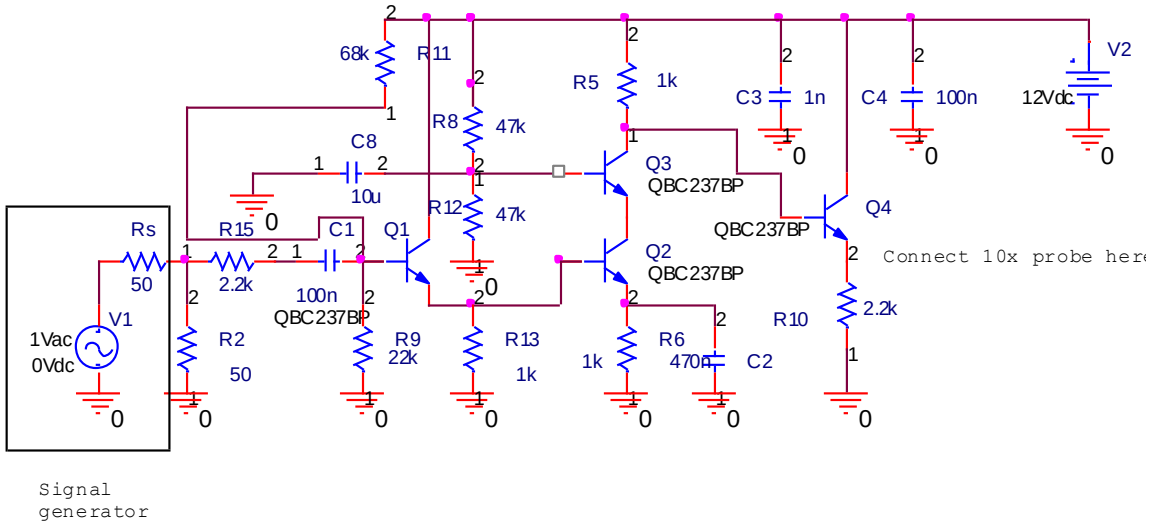
Circuit A



Circuit B



Circuit C



Circuit D

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)
```