EE 140, Spring '94
Final

BJT Parameters:
Is=10E-14
C "pie"= 1E-12
C "mew"=1E-13
Ccs(npn)=1E-12
Ccs(pnp)=0
Va(npn)=Va(pnp)=50
beta(npn)=beta(pnp)=100
Vce(sat)=.2

MOS Parameters:
Vtn=1
Vtp=-1
kn=kp=50E-6
lambda(n)=lambda(p)=.05
gamma(n)=gamma(p)=.3E
Cpie=1E-12
Csb=1E-12
Cdb=1e-12
20f=.6V

Problem #1
What is the DC Voltage at Vout?

Problem #2
What is the Value of R so that Vout = 1V?

Problem #3a
Whatg is the value of Vout/Vin?

Problem #3b
What is Rout?

Problem #4
What is Vout/Vin?

Problem #5a
What is Vout/Vin?

Problem #5b
what is the lowest frequency pole? Wp1:

Problem #6
What is the value of R for an output current of .1mA?

Problem #7
If Vin is set so that Vout=0V, what is the power dissipation of theis circuit?

Problem #8
If the above bode plots are for the op amp in the following circuit, what is the value of R that will give a phase margin of 90 degrees?

Problem #9a
What kind of local feedback is being used in this circuit?

Problem #9b
What is the loop gain, T, of this circuit?

Problem #10a
What is the loop gain of this circuit?

Problem #10a
What is Vout/Vin?

Problem #11a
For parts a, b,and c, assume the input is set so the ouput is at -5V.
If Cc2=20pf and Cc2=0pf what is the slewrate of this circuit

Problem #11b
At what frequency is the dominant pole if Cc1=20pf, and CcB=0pf?

Problem #11c
for Cc1=0pf, what is the value of Cc2 for 45 degrees of phase margin if the poles and zeros of this circuit not associated with Cc2 aare at: fp1: 1Mhz fp2: 1MHz fp3: 10MHz fp4: 100MHz
fz1: 1.0 MHz fz2: 50MHz
Assume that these poles do not move as the pole associated with Cc2 is move. Also assume that the open loop gain, Ao=1E5 (ie, do not calculate the gain)

Problem #12
What is the input offset voltage, Vds, that sets Vout = 0V.