Union College
ECE 248
Spring 2015
Homework #4

Read: Chapter 10 sections 10-1 to (but not including) 10.5
Chapter 11 sections 11-1 to 11-5
Chapter 12 sections 12-1 to 12-3

Due Thursday May 21, 2015

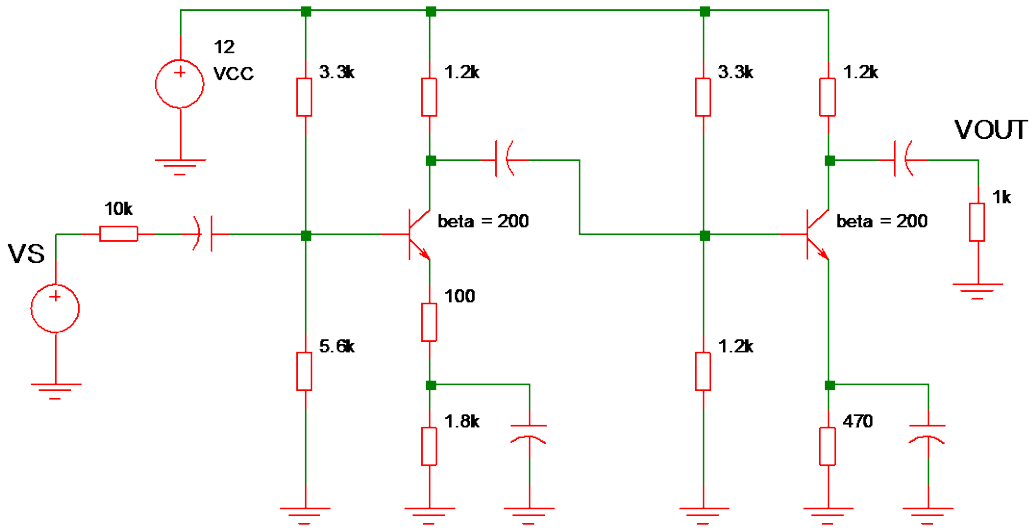
Unless otherwise noted, all problems from Malvino & Bates (7^{th} ed)

A. Emitter Follower

11.3	Assume $\beta = 150$. You should get $r_e' = 3.82$ ohm, $R_{IN} = 1.09$ kohm, and $V_{OUT}/V_S = 0.95$.
11.8	Assume $\beta = 175$. You will find that the voltage divider violates the stiff divider criterion, but not by much. Assume it is "close enough" and proceed with the usual calculations of V_{BB}, I_{EQ}, etc. You should get $r_e' = 0.062$ ohm, $R_{IN} = 63.8$ ohm, and $V_{OUT}/V_S = 0.556$.
11.17	You should find that $r_e' = 0.022$ ohm and $R_{BASE} = 100.5$ kohm
11.xx	Compute the gain V_{OUT}/V_S of the Darlington follower in Problem 11.17. You should get $R_{IN} = 663$ ohm and $V_{OUT}/V_S = 0.52$
11.19	You should get $I_Z = 6$ mA (you must include the transistor base current).
11.28	The transistor power dissipation can be estimated by $P = I_E V_{CE}$. You should get 1.72 W.

B. Multi-stage amplifiers

10.9	You should get $V_{OUT} = 3.44\ V_{PP}$.
10.xx	Compute the signal gain V_{OUT}/V_S for the circuit below. Assume $\beta = 200$. You should get $V_{OUT}/V_S = 54.5$.


12
VCC
3.3k
1.2k
3.3k
1.2k
VOUT
10k
VS
beta = 200
beta = 200
1k
100
5.6k
1.2k
1.8k
470

C. Swamped common emitter

10.y Compute the output voltage in Fig. 10-16, but assume $\beta = 200$. You should get $V_{OUT} = -481$ mV.

D. Maximum undistorted output

12.3 Assume $\beta = 200$ and remember MPP (max peak-to-peak) = 2MP. You should get MPP = $10.6V_{PP}$.

10.z Compute the maximum peak (MP) output of the swamped common emitter in Fig. 10-16 (page 342). Assume $\beta = 200$ (do not use 100). You should get an MP around 3 V.

11.x Compute the maximum peak (MP) output of the emitter follower in Fig. 11-21 (page 370). Assume $\beta = 150$. You should get an MP = 5.3V (approximately).