

Union College
ECE 248
Spring 2018
Assignment 4

Due Friday May 11, 2018

Unless otherwise noted, all problems from Malvino & Bates (8th ed).

Some problems have a “Multisim” label – ignore this and work out the calculations on paper.

A. Base and Input Impedance (Read Textbook Ch 8.10)

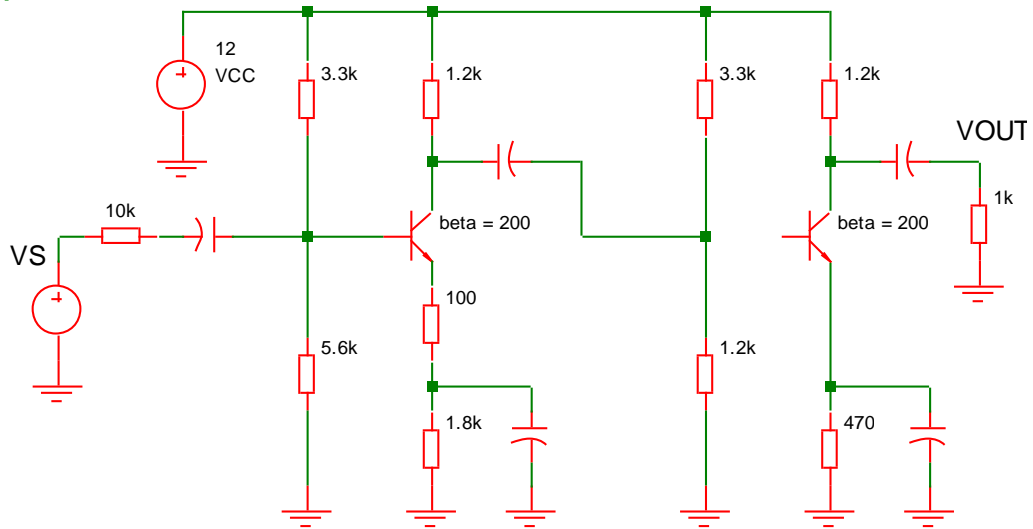
- 8.17 For this circuit, $R_E = 940$ ohm (twice the original value). You should get $R_{BASE} = 2.49$ kohm
- 8.18 For this circuit, $R_E = 470$ ohm (original value). You should get $R_{BASE} = 1.23$ kohm
- 8.27 You should get $r_e' = 47.3$ ohm, $R_{IN} = 1.31$ kohm, and $V_{OUT} = -38$ mV

B. Emitter Follower (Read Textbook Ch 9.3)

- 9.8 Assume $\beta = 175$. Remember that “voltage gain” is defined as $A = V_{OUT}/V_{IN}$. You should get $A = 0.995$, and $V_{OUT} = 0.95$ V.
- 9.13 Assume $\beta = 175$ and $V_G = 1$ V. 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 $A = 0.992$ and $V_{OUT} = 0.556$ V.
- 9.x Assume $\beta = 150$ for both transistors in Fig. 9-32 in the textbook (Darlington follower driving an 8 ohm speaker). Compute the signal gain V_{OUT}/V_S . You should get $V_{OUT}/V_S = 0.52$
- 9.24 You should get $I_Z = 6$ mA (you must include the transistor base current).
- 9.33 The transistor power dissipation can be estimated by $P = I_C V_{CE} + I_B V_{BE}$. Assuming $V_{BE} = 0.7$ V, you should get near 1.7 W.

C. Multi-stage amplifiers (Read Textbook Ch 9.1)

- 9.y Compute the signal gain V_{OUT}/V_S for the circuit below. Assume $\beta = 200$. You should get $V_{OUT}/V_S = 54.5$.



D. Swamped common emitter

9.z Compute the output voltage for the amplifier shown below. You should get $V_{OUT} = -481 \text{ mV}$.

