Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (please print)

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ECE 3355 – Exam #1

February 27, 2025

Keep this quiz closed until you are told to begin.

1. Print your name, and sign your name, at the top of this page.
2. This exam is closed book, closed notes. You may use one 8.5” x 11” crib sheet, or its equivalent. You may use a calculator. You should **not** use a cell phone, tablet computer, or laptop computer, as you work on this exam.
3. Show all work on these pages. You may use both sides of each page. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.
4. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
5. Do not use red ink. Do not use red pencil.
6. You will have 75 minutes to work on this exam.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/20

Room for extra work

1. {40 Points} Two identical amplifiers are connected in a circuit shown in Figure 1. The amplifiers are current amplifiers, and each of them has the equivalent circuit shown in Figure 2. Note the terminal labels for the two amplifiers as they are connected in Figure 1, showing the positions of each terminal. Note that the value of the dependent source variable, *ia*, can be different for the two current amplifiers when you redraw the circuit, so you will want to use different variable names, such as *ia1* and *ia2*.



1. Find the transconductance *ie /vb*.
2. Find the input resistance seen by the source.





Room for extra work

1. {40 Points} The transfer function *H(w)* for a circuit is given below. Plot the straight-line approximation to the phase Bode plot for *H(w)*. Plot over the range from 0.1[rad/s] to 100[krad/s]. Use the semi-log graph paper given on the next pages. Two sheets are provided, in case you need more than one sheet.



1. {20 Points} Find the transfer function, *H(f) = Vo(f)/Vi(f)*, for this circuit. Either show your mathematical work, or explain how you obtained your answer using complete sentences, or both.















