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

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

ECE 3355 – Final Exam

April 30, 2025

Keep this exam 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 100 minutes to work on this exam.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/30
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/30

Room for extra work

1. {30 Points} The straight-line approximation to the magnitude Bode plot for a circuit is shown in the plot below.
2. Find the values for the angular frequency for each of the poles and zeroes in the range between 1[rad/s] and 1[Mrad/s]. Identify which ones are poles and which ones are zeroes.
3. Determine how many poles and how many zeroes are present for each of the angular frequency values you determined in part a). Explain how you determined your answer, briefly, using complete sentences.
4. Find the magnitude of the gain at 220[Hz]. Do not express your answer in [dB].



Room for extra work

1. {40 Points} Assume ideal op amps. Assume that the diode in the circuit below can be modeled with a piecewise-linear diode model, where *Vf* = 1[V],   
   *rd* = 1[kW] or 1[kOhm], and *Is* = 500[mA] or 500[microAmps]. Use the circuit diagram below to solve.
2. Find *vB*.
3. Find *vC*.
4. Find *vE*.



Room for extra work

1. {30 Points} The transistor in the circuit below has *b* = 150, and operates at room temperature.
2. Find the voltage gain, *vd /va* in dB, in the passband.
3. Find the input resistance seen by the source, in the passband.
4. Find the output resistance seen by the load, in the passband.





















