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

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

ECE 3355 – Final Exam

April 29, 2020

1. This exam is closed book, closed notes. You may use one 8.5” x 11” crib sheet, or its equivalent. Do not communicate with anyone except Dr. Shattuck while you are taking this exam.

2. Show all work necessary to complete the problem. Use additional sheets of paper as needed. A solution without the appropriate work shown will receive no credit. A solution that is not given in a reasonable order will lose credit. Clearly indicate your answer (for example by enclosing it in a box). If your answer is a plot, no box is needed.

3. It is assumed that your work will begin on the same page as the problem statement. If you choose to begin your work on another page, you must indicate this on the page with the problem statement, with a clear indication of where the work can be found. **If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.**

4. Show all units in solutions, intermediate results, and figures. Units in the exam will be included between square brackets.

5. Do not use red ink. Do not use red pencil.

6. You will have 140 minutes to work on this exam plus additional time to print, scan and email your work. Email your completed exam to [Shattuck@uh.edu](mailto:Shattuck@uh.edu) . It must be sent before 2:05pm CDT.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/25

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/25

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/25

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/25

Total = 100

1. {25 Points} Assume an ideal op amp. The straight-line approximation to the magnitude Bode plot for *H(f) = Vo/Vi*, is given in Figure 2 for the opamp circuit given in Figure 1. It is known that *R2* = 2.2[k].

a) Find *R1* .

b) Find *C2* .

c) Find *C1* .





2. {25 Points} Assume ideal op amps.

a) Find *vA*.

b) Find *iA*.



3. {25 Points} Assume that the diodes can be modeled using a piece-wise linear diode model with *Vf* = 1[V], *rd* = 1[k], and *Is* = 0. Sketch the transfer characteristic *vO* vs *vI*, for -5[V] < *vI* < +5[V]. Show your work. You do not need to go through a formal guess and test process. Just give enough detail so that your analysis can be followed.



4. {25 Points} Assume that ** = 150, and room temperature operation.



Find *ib/va* in the passband.























