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

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

ECE 2201 – Exam 2

April 6, 2024

Keep this exam closed and face up until you are told to begin.

1. This exam is closed book, closed notes. You may use any calculator. You may **not** use a cell phone, tablet computer, nor laptop computer. You may have a crib sheet in the form of one 8 ½” x 11” piece of paper, with material written on both sides.
2. Print your name, and provide your signature above.
3. Show all work on these pages. 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. You may separate the pages as you work.
4. Show all units in solutions, intermediate results, and figures. Units in the exam will be included between square brackets.
5. If the grader has difficulty following your work because it is messy or disorganized, you will lose credit.
6. Do not use red ink. Do not use red pencil.
7. You will have 100 minutes to work on this exam.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/30

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/35

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/35

Total = 100

Room for extra work

1. (30 points) Use the circuit given below to solve. The charge carriers are electrons.

1. Find *iB*.
2. Find *vC*.
3. Find the power delivered by the 4.3*vA* voltage source.
4. Find *iD*.
5. Which way are the electrons moving through the 18[kW] resistor? Explain your answer, using complete sentences.



Room for extra work

Room for extra work

2. (35 points) Device A can be modeled as a voltage source in series with a resistance. Device A is measured and the table shown gives the resulting values for *vD* and *iD* for two measurements in Figure 1.

Device B can be modeled as a current source in parallel with a resistance. Device B obeys the current vs voltage relationship given in the plot in Figure 2.



a) Find the model for each device, and draw both models, showing numerical values and labeling the terminals for each model.

b) Find the power delivered to   
Device A in the circuit shown in Figure 3. Note the positions of the terminals of the two devices.





Room for extra work

3. (35 points) Use the node-voltage method to write a complete set of equations that could be used to solve this circuit. Do not simplify the circuit. Do not attempt to solve or simplify your equations. Define all variables appropriately.

















