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

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

ECE 2201 – Exam 2

November 5, 2022

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 90 minutes to work on this exam.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/30

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/30

Total = 100

Room for extra work

1. (40 points) Use the diagrams below to solve.

1. Device 1, as shown in Figure 1, can be modeled as a voltage source in series with a resistance. When Device 1 is placed in a circuit as shown in Figure 2, the voltage *v1* is measured to be 10.5[V]. When a 15[V] source is connected across terminals A and B as shown in Figure 3, the current *i1* is measured to be 10[mA]. Note that *v1* and *i1* are defined for Device 1 in Figure 1. Find the complete model for Device 1. Draw the model with clear numerical labels, and labeling terminals A and B.
2. Device 2, as shown in Figure 4, can be modeled as a current source in parallel with a resistance. The relationship of current *i2* with voltage *v2* is shown in   
   Figure 5. What is the model for Device 2 when 6[V] < *v2* < 9[V]? Draw the model with clear numerical labels, and labeling terminals C and D.
3. A 100[W] resistor is attached across terminals A and B for Device 1, and a 100[W] resistor is attached across terminals C and D for Device 2. Which device delivers more power to the 100[W] resistor across its terminals? Indicate the power delivered by each device in your work.

 

  

Room for extra work

2. (30 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.



Room for extra work

3. (30 points) Use the mesh-current 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.



Room for extra work

















