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

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

ECE 2201 – Exam 1

February 26, 2022

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

1. This exam is closed book, closed notes. You may have a crib sheet in the form of one 8 ½” x 11” piece of paper written on both sides.

2. 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.

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

4. If the grader has difficulty following your work because it is messy or disorganized, you will lose credit.

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

6. You will have 90 minutes to work on this exam.

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

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

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

Total = 100

Room for extra work

1. (30 points) Four devices are connected as shown in Figure 1 for time t>0. The voltage vx is shown in Figure 2. Device 1 and Device 4 deliver positive power at some time interval to identical devices i.e. Device 2 and Device 3. The expression for the energy delivered by Device 1 is given as   
   and by Device 4 as .
   1. Find the currents flowing through Device 1 and Device 4 as a function of time.
   2. Make plots of these currents i1 and i4 as a function of time and determine **when** each of these devices delivers power.
   3. Find the time **when** both Device 2 and Device 3 start to absorb the power.
   4. Make plots of the currents i2 and i3.

A picture containing night sky

Description automatically generated A picture containing shape

Description automatically generated

Room for Extra Work

2. (35 points) For the circuit below, do the following.

1. Find the voltage *vz.*
2. Find the power delivered by the dependent voltage source 2*vX*.

A picture containing diagram

Description automatically generated

Room For Extra Work

1. (35 points) Use the circuit shown below to solve.

A picture containing application

Description automatically generated

1. Find the numerical value of *vA*.
2. Find the numerical value of *iA*.
3. Find the power delivered to the dependent voltage source.

Room For Extra Work

1. (30 points) Four devices are connected as shown in Figure 1 for time t>0. The voltage vx is shown in Figure 2. Device 1 and Device 4 deliver positive power at some time interval to identical devices i.e. Device 2 and Device 3. The expression for the energy delivered by Device 1 is given as   
   and by Device 4 as .
   1. Find the currents flowing through Device 1 and Device 4 as a function of time.
   2. Make plots of these currents i1 and i4 as a function of time and determine **when** each of these devices delivers power.
   3. Find the time **when** both Device 2 and Device 3 start to absorb the power.
   4. Make plots of the currents i2 and i3.

Diagram

Description automatically generated

Room for extra work

Diagram

Description automatically generated

2. (35 points) For the circuit below, do the following.

1. Find the voltage *vz.*
2. Find the power delivered by the dependent voltage source 2*vX*.

Diagram, schematic

Description automatically generated

Text, letter

Description automatically generated





