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

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

ECE 2202 – Final Exam

August 12, 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. Print your name, and provide your signature above.

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 160 minutes to work on this exam.

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

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/40

Total = 200

Room for extra work

1. {40 Points} Use the circuit below to solve. The charge carriers in this circuit are electrons.
2. Find the Norton equivalent as seen by the 25[V] voltage source.
3. Draw the Norton equivalent, and connect it to the 25[V] voltage source. Use numerical values for labels for all components.
4. Find the power delivered by the 25[V] voltage source.
5. Find the energy absorbed by the 25[V] voltage source during a 15[ms] time period.

Diagram

Description automatically generated

Room for Extra Work

2. {40 points} In this circuit, Switch SWA had been closed, and Switch SWB had been open, for a long time before *t* = 0. Then, at *t* = 0, Switch SWA opened. After that, at *t* = 1.2[ms], Switch SWA closed and Switch SWB closed. Find *vB* (2.5[ms]).

Diagram

Description automatically generated

Room For Extra Work

3. {40 points} In this circuit, Switch SWA had been open, and Switch SWB had been closed, for a long time before *t* = 0. Then, at *t* = 0, Switch SWA closed and Switch SWB opened. Find the energy stored in inductor *LA* at *t =* (1.2[s]).

Diagram, letter

Description automatically generated

Room For Extra Work

1. {40 Points}. The circuit shown operates in steady state.
2. Redraw the circuit in the phasor domain.
3. Find all values of *LX* so that the zero-to-peak magnitude of *vA(t)* is 43[V].

Text, letter

Description automatically generated

Room for extra work

1. {40 Points} The circuit shown is in steady state.
2. Find the complex power delivered by the source.
3. Find the real power delivered by the source.
4. Find the reactive power delivered by the source.
5. Find the power factor for the circuit connected to the source.
6. Find *vB*(t).

Diagram

Description automatically generated

Diagram

Description automatically generated

Diagram

Description automatically generated

Diagram, schematic

Description automatically generated

Diagram

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Diagram

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Text, letter

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Diagram, schematic

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Diagram, schematic

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Description automatically generated with low confidence