Peoplesoft ID Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ECE 2202 – Quiz #4

August 9, 2021

1. You may use one 8.5” x 11” crib sheet, or its equivalent. Do not communicate with anyone except Dr. Dave Shattuck while you are taking this quiz.

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 which is not given in a reasonable order will lose credit. Include this page with your Peoplesoft ID Number, or include a different, separate page with your Peoplesoft ID Number. Do not write your name on this quiz. Failure to follow these rules will result in points being deducted.

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

4. Do not use red ink. Do not use red pencil.

5. You will have 40 minutes to work on this quiz, plus additional time to print, scan and email your work. Use a filename which is your Peoplesoft ID Number, followed by Quiz4. Post your solution on Blackboard, in the same way you submit homework assignments. It must be submitted by 3:50pm, or points will be deducted.

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A current source is connected to three loads. The three loads are connected together in parallel. The circuit is in steady-state.

The first load, called Load 1, absorbs 37.4[kW], and delivers 27.1[kVAR].

The second load, called Load 2, absorbs 42.9[kW] at a leading power factor   
of 0.79.

The third load, called Load 3, absorbs 36.9[kVA] at a lagging power factor of 0.81.

The current source is defined as *iA(t)* and has a value which is

*iA(t)* = 78.3[A] sin(380[rad/s]*t* +23.2°).

1. Draw the circuit in the phasor domain. Use a box to represent each of the three loads.
2. Define a voltage across the current source, on the diagram you drew in   
   part a).
3. Find a numerical expression for the voltage that you defined in part b).
4. Convert that voltage you found in part c) back to the time domain, and write that numerical expression as a function of time, *t*.
5. Find the period of the voltage that you found in part d).

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