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

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

ECE 2300 -- Quiz #6

December 4, 2013

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

1. This quiz is closed book, closed notes. You may use one 8.5” x 11” crib sheet, or its equivalent.

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 that is not given in a reasonable order will lose credit. Clearly indicate your answer (for example by enclosing it in a box).

3. It is assumed that your work will begin on the same page as the problem statement. If you choose to begin your work on another page, you must indicate this on the page with the problem statement, with a clear indication of where the work can be found. **If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.**

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

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

6. You will have 20 minutes to work on this quiz.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/20

Room for extra work

Three loads in the figure below are connected in parallel across a 110[Vrms], 60[Hz] sinusoidal voltage source as shown in the figure. The circuit is in the steady-state.

Load 1 absorbs 450[W] and absorbs 500[VAR].

Load 2 absorbs (1850–40[VA].

Load 3 absorbs 750[VA] with a leading power factor of 0.83.

Find the phase shift between *vS(t)* and *iX(t)*. Assume that *vS(t)* is a cosine function with a phase of zero. Also, state whether the combined load, as seen by the source, is inductive or capacitive.



Room for extra work

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

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

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/20

Room for extra work

Three loads in the figure below are connected in parallel across a 110[Vrms], 60[Hz] sinusoidal voltage source as shown in the figure. The circuit is in the steady-state.

Load 1 absorbs 750[W] and absorbs 900[VAR].

Load 2 absorbs (850–40[VA].

Load 3 absorbs 750[VA] with a lagging power factor of 0.83.

Find the phase shift between *vS(t)* and *iX(t)*. Assume that *vS(t)* is a cosine function with a phase of zero. Also, state whether the combined load, as seen by the source, is inductive or capacitive.



Room for extra work

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ECE 2300 -- Quiz #6

December 4, 2013

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/20

Room for extra work

Three loads in the figure below are connected in parallel across a 110[Vrms], 60[Hz] sinusoidal voltage source as shown in the figure. The circuit is in the steady-state.

Load 1 absorbs 1450[W] and delivers 700[VAR].

Load 2 absorbs (185040[VA].

Load 3 absorbs 750[VA] with a lagging power factor of 0.83.

Find the phase shift between *vS(t)* and *iX(t)*. Assume that *vS(t)* is a cosine function with a phase of zero. Also, state whether the combined load, as seen by the source, is inductive or capacitive.



Room for extra work

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

ECE 2300 -- Quiz #6

December 4, 2013

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6. You will have 20 minutes to work on this quiz.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/20

Room for extra work

Three loads in the figure below are connected in parallel across a 110[Vrms], 60[Hz] sinusoidal voltage source as shown in the figure. The circuit is in the steady-state.

Load 1 absorbs 650[W] and absorbs 900[VAR].

Load 2 absorbs (2250–40[VA].

Load 3 absorbs 750[VA] with a lagging power factor of 0.83.

Find the phase shift between *vS(t)* and *iX(t)*. Assume that *vS(t)* is a cosine function with a phase of zero. Also, state whether the combined load, as seen by the source, is inductive or capacitive.



Room for extra work

ECE 2300 -- Quiz #6 – December 4, 2013 – Solutions

There are four versions of the quiz. Each of the solutions follows, in turn.

