EECS 211 Circuits I  
Fall Semester 2017  
Assignment #1 Due 29 August 2017

Reading: Chapter 1, Sections 2.1 - 2.3, Appendix 2, and Appendix 5 in Hayt/Kemmerly/Durbin

Do all of the Practice problems in the Reading assignment (but do not hand them in).

For this first set of questions (1-4), provide an answer from your prior experience. Do not look up the answers anywhere (books, web, etc). These problems will not be graded for correct/incorrect answers; rather, you will be given full credit for each question if you simply make a reasonable attempt to answer the question (which could be the response "I have no idea what the answer is.").

1. State Ohm’s Law. Define any symbols or notation that you use.

2. Questions about voltage and current.
   a. What is the difference between voltage and current?
   b. Sitting in front of you is a box; you cannot see inside the box. The box has a power cord that is plugged into a working wall socket. There is a wire coming out of the box; the end of the wire outside the box is exposed (not insulated) and is not connected to anything.
      i. Can there be current flowing in the wire while it is not connected to anything?
      ii. Could it be dangerous to touch the exposed end of the wire? Why or why not?

3. Questions on series and parallel connections.
   a. A room has one light controlled by one switch. Should the switch and light be wired in series or in parallel or neither?
   b. A room has many lights controlled by one switch. Should the lights be wired in series or in parallel or neither? What is the reason for the choice?

4. Questions about DC and AC.
   a. In an electrical context, what do DC and AC stand for? How do they differ?
   b. Is a battery a DC device, an AC device, or neither?

Note: the next 3 problems are over complex numbers, sinusoids, and the solution of simultaneous linear equations, all of which should be review topics.

5. Let two complex numbers be $a = -2 + j4$ and $b = 3 - j5$, where $j$ is $\sqrt{-1}$.
   a. Find the sum $a + b$, expressed in rectangular form.
   b. Express $a$ in polar form. That is, find the magnitude and angle of $a$.
   c. Find the real part of the product $ab$.
   d. Check your answer to the last part by finding the answer using a different method.

6. Consider the following cosine function.
   
   $-5 \cos(400t - \pi/2)$ Amps

   a. Give the amplitude, frequency, and phase of the function. Give frequency in both Hz and radians/sec (r/s). Give phase in both radians and degrees. Note: these quantities can be found by using trigonometric identities as needed to put the function in the form $A \cos(2\pi ft + \phi)$, where $A$ is a positive number (which is then the amplitude), $f$ is frequency in Hz units, and $\phi$ is the phase.
b. Express this same function as a sine function.

7. Consider the following system of equations.

\[
\begin{align*}
3x - 5y &= 7 \\
6y - 8 &= 4x
\end{align*}
\]

a. Solve for \(x\) and \(y\).

b. Check your answers by substituting the values back into the original equations.

The following questions are intended to ensure that you have read and understood the information in the course information sheet (syllabus) that was handed out on the first day of class (the syllabus is also posted on the course web page).

8. Send an email message to me with "211 your_last_name" in the subject line. You may include any questions that you might have, but do not include your answers to any of the other questions/problems of this assignment or of Assignment 0; those answers must be turned in on paper on the due date.

9. Where is my office and what are my office hours?

10. On the course web site is a "First Assignment Codeword" -- what is it?

11. Suppose you have the following scores -- what will your course score be?

- Homework Average: 85%
- Quiz Average: 80%
- Exam 1: 65 out of 90 possible points
- Exam 2: 82 out of 100 possible points
- Final Exam: 100 out of 120 possible points

12. If you have a course score of 90 Course Points (out of the 102 possible), will you get an A- for the course?

13. What material are you allowed to bring to exams? What material will be provided to you?

14. What must you do if you will not be able to attend one of the exams?

15. How will you get solutions for the weekly homework assignments?

16. What will we do during the Monday afternoon discussion sessions?

17. What is the name of the Supplemental Instructor for this course?

18. What are the dates (some tentative at this point) Exam 1, Exam 2, and the Final Exam? It would be a good idea to put them on your calendar/planner/phone now.