EAS 199A **Homework 1** **Due 3 October 2011**

NOTE: Use engineering format for problems 2 through 6. Since the answers are given, you should put effort into developing a concise, organized and accurate analysis leading up the final value. This is an individual assignment. You must *complete* the assignment on your own. You may discuss the problems and solution techniques with other class members. You may not copy the work of other students, exchange of PowerPoint slides, or share the finished of work others.

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1. Send the instructor an email message using your PSU email address. Briefly describe how or where you obtained your Arduino experimenter's kit. List the tools in the general toolkit that you have obtained so far.

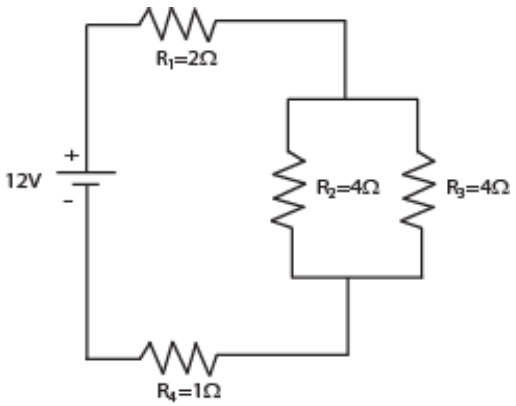
2. Estimate the number of copper atoms in an 8 gage (or gauge) wire that is two feet long? Hint: You may need to find the size of the wire on the Internet and look at a periodic table of elements. When looking for gage, you may find that some people spell it as gauge and denote the size as 8 AWG where AWG stands for American Wire Gage. **Answer = 4.33 x 10^{23} atoms**

3. What is the current through a conductor that carries a charge of 13,129 C (coulombs) across it in 9 minutes? **Answer = 24.3 A**

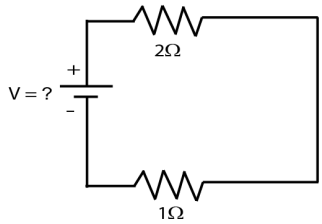
4. A lamp is plugged into 10 volt DC power source. An ammeter attached to the circuit indicates a current of 2 amps. Using this information, how many ohms of resistance does the lamp provide? **Answer = 5Ω**

5. An ideal voltage source of 12 volts is attached to a set of four resistors with R_1=2Ω, R_2=4Ω, R_3=4Ω and R_4=1Ω as shown below.

   (a) Find the equivalent resistance of the circuit diagram. **Answer = 5Ω**
   (b) Draw the equivalent circuit diagram (using standard symbols for the voltage source and the resistor).
   (c) Compute the current leaving the power source. **Answer = 2.4A**



6. Consider the circuit below. Compute the voltage required to induce a current of 1 A through the circuit.
   Answer = 3V



7. Using the Internet and any other resources, study the history of human population starting as far back as you wish to go (but at least to 0 A.D.). Plot the history of population (a hand plot is acceptable as long as it is neat). Prepare a PowerPoint presentation (5 minutes) describing what you have learned, reasons for population growth, and population predictions for the future. Be sure to embed your plot into the presentation and discuss it in the body of your presentation. Print your presentation six slides per page, and turn it in with your homework. Bring your presentation to class on a thumb drive. Some students will be called on to give their presentations in front of the class.
   (This is not meant to be an exhaustive study of the history of human population. Estimated time to prepare presentation = 1 to 1.5 hours;)

   Tips for PowerPoint Presentations

   a) The first slide should contain the title, your first and last name, the presentation date, and the place you are presenting (Portland State University, EAS 199A).
   b) Slides should not contain excessive text. When using text, short phrases or facts listed with bullets are effective. Try to use a maximum of five bullets per slide, but slides with zero bullets are acceptable. Bullets are not the solution for all presentation slides.
   c) Pictures and diagrams are preferred over text when possible, but pictures are not necessarily required for every slide. Utilize the pictures and diagrams to help your audience understand your subject. Avoid making your slides too busy.
   d) Practice your presentation before coming to class.
   e) A good rule of thumb is to spend about one minute per slide, but that is not a strict rule to apply in all cases.
   f) Make sure your colors work together. For example, never use red text on a blue background.