Exam 2: Phy 122  Study Guide  
(These are guidelines only, you are expected to know all material covered in assignments, lecture, readings, labs, and tutorials.)

Chapter 18: sections 1-7, 11  
Chapter 19: sections 1-4, 6-7  
Chapter 20: sections 1-4, 6-11, 14-15 (only circuits with 1 battery)

4. Analyze Situations Involving Static Electricity: (chapters 18-19)
   a. Describe how objects are charged, directly and by induction.
   b. State Coulomb’s Law.
      You should also be able to explain the limits to its use. In other words, when can you use Coulomb’s Law and when can you not use it?
   c. Describe, analyze, and predict motion and forces for systems that include charged objects or a given electric field.
      When you do homework problems that involve static electric forces where you need to draw a FBD to solve the problem you are doing this.
   d. Describe, operationally, the Electric Field. Distinguish it from an Electric Force
      Remember that an operational definition is one where you explain the steps someone would have to follow in order to measure or calculate a particular quantity. You should review the general types of charge distributions that we have been working with. These include combinations of point charges and line/plate charges.
   e. Describe, operationally, the Electric Potential. Distinguish it from an Electric Potential Energy
      Remember that an operational definition is one where you explain the steps someone would have to follow in order to measure or calculate a particular quantity. You should review the general types of charge distributions that we have been working with. These include combinations of point charges and line/plate charges.
   f. Analyze the effect of a given electric field on charged particles from an electric field map or equipotential line diagram.
      This was done in the lab where we mapped equipotential lines and then added things to the map about “electric land”. You should also review the practice sheet that we did in class and the tutorial on Electrical Potential Difference.
   g. Describe a capacitor in terms of charge and its general use.
      Describe in very general terms. Not capacitor calculations on the exam.
Do You Understand Outcome 4?

What would a graph look like if $V$ were graphed versus $x$ for a region where there is an electric field? Look at all the variables we used. What is the meaning (if there is one) of the coordinate, slope, and area.

Can you make comparisons between gravitational fields and electric fields?

5. Analyze simple DC resistor circuits: (chapter 20)

a. Describe operationally the difference between insulators and conductors.

b. Define and solve problems using Resistance, Voltage (EPD), Current, Power, and Resistivity.

You should know equations and definitions of all of these.

c. Apply Ohm’s Law to simple DC circuits.

You should also be able to explain how Ohm’s Law applies to applications of simple circuits such as house wiring.

d. Solve simple circuits (circuit analysis). This includes drawing equivalent circuits.

Follow the process given in class to completely solve a circuit containing 1 battery and any number of resistors. When done completely you should be able to answer the following questions:

- What is the current through a particular resistor (or group of resistors)?
- What is the voltage across a particular resistor (or group of resistors)?
- What is the power dissipated by a particular resistor (or group of resistors)?
- What is the equivalent resistance of a group or resistors?

e. Demonstrate the proper use of a multimeter to measure the resistance of, current through, and voltage across a circuit element.

Review your Ohm’s Law lab. You can also practice with the simulation program (phet link). You should also be able to explain how to use the equipment safely so that you are not hurt and the equipment is not damaged.

f. Wire a circuit from a schematic and vice versa.

Review your Circuits tutorial and the Ohm’s Law lab. You can also practice with the simulation program (phet link).
Do You Understand Outcome 5? (Chapter 20)

Try setting up a fairly complex DC circuit with multiple resistors and 1 battery using the online simulation. Using the process taught in class, analyze the circuit. No use the simulated test equipment to check you voltages and currents.

Study:

Look over your webassign assignments. Redo the problems without looking at your solutions.

Read your text and try the example problems without looking at how they are solved. Write down the main point of each section. Study the reading notes download from the main website.

Read the book and do the example problems without looking at how they are solved. Write down the main point of each section.

Go over the labs. Can you redo the theory and analysis without looking?

Look over your quizzes and try to redo without looking.

Bring for the exam:

- 3x5 inch card with handwritten notes on one side only
- Graph paper
- Extra blank paper if you wish
- The usual pencils, erasers, calculator, etc.