Electrical Principles /49

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Open Book Final Assignment:

**Read all parts of your assignment carefully and record your answers in the appropriate places.**

1. How does adding loads into a series circuit affect its resistance? Explain.
2. Draw a circuit diagram for a household circuit that contains
   1. two lights controlled by a single switch
   2. four plug-ins that have constant power
   3. a closet light that can be turned on or off independently
   4. Use the symbol –(P)– for the plug-ins.

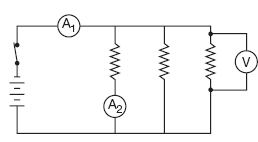
1. Refer to the circuit diagram in question 20 on page 350 of the textbook.
   1. How many batteries are in the circuit?
   2. Are the electrons flowing clockwise or counterclockwise? Why?
   3. Which bulb(s) would be on in this circuit?
   4. Which bulb(s) would be on if bulb C burned out and switch F were closed?
2. Suppose you want to connect the speakers in your room to the stereo downstairs. Think about the choices you should make to ensure a safe installation and the strongest possible signal. List three appropriate choices. For each choice, explain why you made the choice.

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1. Explain the function of each of the following wet cell components.
   1. negative electrode
   2. positive electrode
   3. electrolyte
2. A single fully charged lead-acid cell delivers 2 V.
   1. How many cells are required to build a 12 V car battery?
   2. How should the cells be connected? Why?
3. Some TV picture tubes require an operating voltage of 20 000 V (20 kV). How could this be achieved when the television set is plugged into a 120 V outlet? Be specific.
4. A simple circuit consists of a battery, a switch, and a 9.0 W resistor in series. The battery uses three 1.5 V cells connected in parallel. Determine the current that flows through this circuit when the switch is closed. Show your work.
5. Refer to the following diagram to answer the questions.



 The resistors in this circuit each have a resistance of 5.0 W. The battery supplies a voltage of 4.5 V to the circuit.

1. Determine the reading on the voltmeter. Use your knowledge of circuit voltage to explain your reasoning.
2. Determine the reading on meter A2. Show your work.
3. Determine the reading on meter A1. Use your knowledge of circuits to give your reasoning. Be specific.
4. Identify the following energy converters by filling in the answer blanks after each description.
   1. two strips of metal used to convert heat into electricity \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. two strips of metal in a paste used to convert chemical energy into electrical energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. converts light into electrical energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. a crystal with electrons that vibrate converting sound or kinetic energy into electrical energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. converts electrical into magnetic "energy" (The energy is stored in the field around a magnet.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. opposes the flow of electrons to convert electrical energy into thermal energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. converts chemical energy into thermal energy into electrical energy with no moving parts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. converts electrical energy into mechanical energy using an electromagnet \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. converts mechanical energy into electricity \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. When you use a rheostat, where does the lost energy go? Be specific. Why might this be a problem?