EE 221 EXAM #1 - 9 September 2005

I. PART 1
True or False / Short Answer / Fill in the Blank

1. (2 pts) What unit is appropriate for expressing the amount of energy (W) ? J

2. (2 pts) In taking a current measurement, current meters are connected in **SERIES / PARALLEL** (circle one) and thus it is desirable that they have **LOW / HIGH** (circle one) internal resistance.

3. (2 pts) Write a correct mathematical relationship between power and energy.

$$p = \frac{dw}{dt}$$

4. (4 pts) For a resistor with a length L and cross sectional area of material A, decreased resistance can be expected with which of the following conditions: **Mark each one as True (T) or False (F)**

   a. a material with lower resistivity T

   b. a shorter length of material with area A T

   c. a larger cross sectional area of 3A T

   d. a longer length of material with area A F

5. (2 pts) A 30 Ω resistor with 10% tolerance is rated at 250 watts. 2 Amps are flowing through the resistor. You would expect (**Circle one**)

   a. failure of the resistor manifest by short or open circuit

   b. no problem

6. (2 pts) To use a digital multimeter to check current flow in a circuit (**Circle the best answer**)

   a. Place the meter on the (AC or DC) amps setting and connect leads to the correct meter terminals (labeled for current)

   b. Place the meter in line with current flow so that ALL current flow in the circuit must go through the meter

   c. Ensure that the battery is isolated from the load of interest

   d. Both a. and b.

7. (2 pts) Seven 6 Ω resistors connected in series have equivalent resistance of 42 Ω.

8. (2 pts) Six 6 Ω resistors connected in parallel have equivalent resistance of 1 Ω.

9. (2 pts) The current divider rule can be used to determine how current divides among components or groups of components that are in **SERIES / PARALLEL.** (**Circle one**).

10. (2 pts) **TRUE / FALSE** (**Circle one**) Kirchhoff's voltage law states that the sum of voltages around a closed path is equal to the area under the power vs. time curve.