Physics 115 – Section 0101
Homework #5
Due March 5, 2008

Essay 1 (10 points)

a) Draw the magnetic field lines of a bar magnet. Describe two experiments you did to "see" the magnetic field lines. Explain how we assigned a direction to the field line.

b) Draw the magnetic field lines of a bar magnet when like poles face each other and when unlike poles face each other. Explain why a compass placed at different points (to the left, in between the poles, in between the magnets, to the right of the second magnet) behaves the way it does. (4 cases to explain for each scenario).

Essay 2 (10 points)

Can a magnetic field created only by a magnet? If not, what other way can you think of? Describe the rule you used to find the magnetic field direction in that case.

Essay 3. (10 points)

Explain how you can find the polarity of an unknown battery. Use pictures as necessary.

Problem 1 (20 points)

a) What is an ohmic resistor? Do you know any example of a resistor that does not obey ohms law? What is the possible reason it does not obey ohms law?

EFFECTIVE RESISTANCE.

The effective resistance of the circuit (R_{eff}) with two resistors R1 and R2, is the resistance of a single resistor that draws the same current from the battery, when R1 and R2 are replaced by the single resistor. When two resistors are connected in series, R_{eff}=R1+R2. When they are connected in paraller, $1/R_{eff}$=1/R1+1/R2.

b) Use this to explain what happens to the brightness of the bulb when another bulb is added in series.
c) What happens when you add a bulb in parallel? How does the effective resistance change the current drawn from the battery when you connect a bulb in parallel?
d) Use the formula given to check the 3 parallel combinations you used in the lab