**Physics 200**

**Chapter 27 Current and Resistance (Homework)**

1. A small sphere carrying a charge, Q, is swung in a circle at N revolutions per minute. What is the current in the circle?

2. A wire whose radius is "a" carries current, I. What is the electron drift speed in the wire? (Density of the material is "ρ".)

3. A potential difference, V, is maintained across a wire of length, L. The wire's cross sectional area is "A" and the resistivity of the wire is "ρ". What is the current density in the wire?

4. A potential difference, V, causes a current, I, in a wire of length, L, that has a radius, a. Calculate the resistivity of the wire.

5. A wire has a resistance, R. The wire is cut into four pieces of equal length and the pieces are then connected side by side forming a new wire that has one fourth the length and four times the area of the original wire. What is the resistance of the new wire?

6. Calculate the resistance of a hollow circular cylinder. The inner radius is "a" and the outer radius is "b" and the cylinder has length, "L". (Current enters one end of the cylinder and leaves the outer surface.)

7. The small end of a truncated square cone has sides of length, a, and the large end has and sides of length, b. The truncated cone has height, h. Calculate the resistance of the cone if the current enters the small and exits the large end of the cone.

8. A washer has an inner radius, a, and an outer radius, b, and a thickness, t. Its resistivity is "ρ". What is the resistance of the washer when current flows radially outward?

9. An immersion heater melts a mass, m, of ice in time, t, when the voltage is "V". Find the current through the heater. (Latent heat of ice is "L".)

10. A potential difference, V, is maintained across a wire of length, L. The wire's cross sectional area "A" and has a resistivity, ρ. What is the rate at which energy is being dissipated by the wire?