1. (8 points) Answer each of the following.
   a. How much current does a 100-W light bulb draw if its operating voltage is 120 V?
   
b. What is the resistance of the bulb in part a?
   
c. What is the force of attraction between a positive 2.0 C charge and a negative 4.0 C charge separated by 0.50 m?
   
d. A toaster has a resistance of 20 S and runs on a 120 V house circuit. What current does the toaster draw?
   
e. A current of 25.0 A flows in a wire for 15.0 s. How much charge passes a given point in this amount of time?

2. (6 points)
   a. Three resistors – 15 S, 25 S, and 50 S - are connected in series and connected to a 25.0 V battery. What is the equivalent resistance of the circuit?
   
b. How much current flows in the circuit of part a?
   
c. How much power is expended in the circuit?
3. (6 points)
   a. Three resistors – 15 S, 25 S, and 50 S - are connected in parallel and connected to a 25.0 V battery. What is the equivalent resistance of the circuit?

   b. How much current flows in the circuit of part a?

   c. How much power is expended in the circuit?

4. (6 points) A charge of +1.0 C and mass 1.5-kg is fixed in place. Another charge of -2.0 C and mass 1.0-kg is placed 0.50 m away from the first charge.

   a. Find the gravitational force of attraction between the two charges.

   b. Find the force of electrostatic attraction between the two charges.

   c. What percent is the gravitational force of attraction of the electrostatic force of attraction?

   d. If one were to let go of the negative charge, what would its initial acceleration be toward the positive charge? (Hint: Ignore the gravitational part of the force. And, remember Newton’s second law.)