

# Lab 01 – Electrostatics

## Lab Worksheet

Complete this lab worksheet and turn it in for credit. Show all your work including the calculations you performed (attach additional sheets if necessary).

### 1.4.1 Charging Objects

Predict what you think will happen when you move (a) positively charged and (b) negatively charged object near (but not touching) the terminal ball of an uncharged electroscope.

1. Draw a picture of the electroscope **along with the location of the charges** when the **negatively charged rod** is at the described locations.

|  |  |
|--|--|
| a. before you begin (uncharged electroscope) | b. When the charged rod is close, but not touching the ball. |
| c. When the charged rod is touching the ball | c. After moving the rod away from the ball                   |

2. Draw a picture of the electroscope along with the location of the charges when the negatively charged rod is at the described locations.

|  |  |
|--|--|
| a. before you begin (uncharged electroscope) | b. When the charged rod is close, but not touching the ball. |
| c. When the charged rod is touching the ball | c. After moving the rod away from the ball                   |

Describe how the previous two experiments demonstrate the Coulomb force.

3. Describe the experiment you devised, and show the results. Use pictures!

4. Draw a picture of the electroscope for the following steps. Draw the location of the charges in each.

|   |  |
|---|--|
| a. Fingers on the electroscope, charged rod far away. | b. Fingers on the electroscope, charged rod near, but not touching ball. |
| c. After removing your fingers.                       | c. After moving the rod away from the ball                               |

What charge is left on the electroscope? How do you know?

### **1.4.2 Discharging**

5. Describe what happens when you touch the charged electroscope to the sink pipe. Compare to touching the ball with your fingers. Explain what you observed
  
6. What happened when you brought the lit match near the charged electroscope? How do you explain this?

### **1.4.3 The Van de Graaff Generator**

7. What was the charge on the electroscope?

Describe what happened when the charged proof plane was brought near the electroscope.

What does this tell you about the charge of the Van De Graaf Generator. Explain.

### **1.4.4 Polarization**

Predict what will happen when a positively charged rod is brought near a neutral rod.

Now perform the experiment. Put the uncharged rod in the cradle, and bring a positively charged rod near (but not touching) the uncharged rod. Describe what happened.

Now predict what will happen when a negatively charged rod is brought near a neutral rod.

Perform the experiment. Again, describe what happened.

Explain the results of these experiments – use pictures.

8. Now bring a charged rod near some bits of paper. Describe what happens. Repeat with the oppositely charged rod. Explain your observations with pictures.

9. What happened when the charged rod was brought near the stream of water? Explain your observations with pictures.

### 1.4.5 Repulsion and Distance

10. Record the maximum distance of the rod \_\_\_\_\_

Make tables of distance and angle as described in the lab manual. From this data make a graph as described. Attach both the tables and the graph to this worksheet.

How does the force vary with distance?

Compare the amount of charge on the rubber and glass rods.

Does the sign of the charge change the general behavior?