# In-Class Lab: Electrostatic Charges

Name:

Date:

Instructor:

Section:

## For Online Submissions

Take a photo or scan a copy showing ALL calculations performed during this lab and upload it with this Lab Report in D2L.

# Procedure A: Charging by Rubbing Objects Together

Note: The answers to the fill in the blanks questions are about the registers polarity of the electrometer. Answer Either: 'Positive', 'Negative' or 'Zero'.

While rubbing the two charge producers together inside the basket:

The charge detected is:

After rubbing, with wands still in the basket, but not touching:

The charge detected is:

After removing the dark wand from the basket:

The charge detected on the white wand alone is:

The charge detected on the dark wand alone is:

#### Questions

1. While the two wands were being rubbed against each other, what was their overall net charge?

2. After the rubbing process, what was the net overall charge of the two wands?

3. What is the evidence that the rubbing process gave each wand an electric charge?

4. Explain how this experiment demonstrates the law of conservation of charge.

### Procedure B: Charging by Contact

After placing the white charge producer in the inner basket:

The charge detected is:

After letting the charge producer touch the wall of the basket:

The charge detected is:

After inserting the dark charge producer into the inner basket and letting it touch the basket:

The charge detected is:

#### Questions

1. Before the white wand touched the basket, what was the polarity of the white wand? What was the state of the basket?

2. After the white wand touched the basket, what was the polarity of the basket? Did the basket gain or lose electrons during the contact with the white wand? Where did the electrons go (or come from)?

3. After the dark wand touched the basket, what was the polarity of the basket? Did the basket gain or lose electrons during the contact with the dark wand? Where did the electrons go (or come from)?

4. When a charged object touches an initially neutral object, the neutral object acquires a charge. How does the polarity acquired by the initially neutral object compare to the polarity of the charged object that touched it?

### Procedure C: Charging by Induction

Without letting the wand touch the ice pail:

The polarity of the charge on the white wand is:

After grounding the ice pail and removing the wand:

The polarity of the charge on the pail is:

Repetition with the dark charge producer:

The polarity of the charge on the dark wand is:

After the polarity of the charge on the pail is:

#### Questions

1. At the end of the process, how does the charge acquired by the pail compare to the polarity of the charge on the wand that was used?

2. When using the white wand: Did the ice pail gain or lose electrons during the charging by induction process? Where did the electrons go (or come from)?

3. When using the dark wand: Did the ice pail gain or lose electrons during the charging by induction process? Where did the electrons go (or come from)?

# Data

	Reading	$\operatorname{Run} 1 (V)$	Run 2 (V)	Run 3 (V)	
1	Initial				
2	After Rub				
3	After Separation				
4	Dark Out				
5	Both In				
6	White Out				
7	Final				
8	Both Out				

 Table 1: Electrometer Voltages

#### Table 2: Charge By Contact/Induction

	State	White Disk Contact	Dark Disk Contact	White Disk Induction	Dark Disk Induction
		(V)	$(\mathbf{V})$	(V)	$(\mathbf{V})$
1	Zero				
2	Initial				
3	After Touch				
4	Disk Out				

 Table 3: Spherical Charge Distribution

Point	Electrometer Voltage (V)
А	
В	
С	

Table 4: Voltage vs. Charge on a Sphere

Sphere Potential (V)	Electrometer Voltage (V)
1000	
2000	
3000	

Table 6:	Sphere	Voltages
----------	--------	----------

 Table 5: Non-Spherical Charge Distribution

Point	Electrometer Voltage (V)
А	
В	
С	

	Sphere with	Electrometer
	Hole	Voltage (V)
1	Inside	
2	Inside near hole	
3	Outside	
4	Inside Again	
5	Outside Again	