

# LAB REPORT GUIDELINES

## FOR PHYSICS 7

There will be approximately nine laboratory experiments performed during the semester for Physics 7. *For each experiment a lab report is due approximately one week after the lab is completed*, (the instructor will indicate the exact due date). The basic information to include in the reports is a complete set of data obtained during the experiment, analysis and interpretation of the data, and a conclusion section. By including the following sections, in the order given, you will be writing a complete report\*.

1. Standard Cover Page. Complete the standard cover page and attach it to your report. Ensure that all sections are included in the order indicated.
2. Original Data Sheets. Please append your original data-sheets. They should be dated, neat, clear, and be an accurate record of what was done. The make, model and serial number of any major piece of equipment used should be recorded. The reason for doing this is that if you suspect that the equipment was faulty after analyzing the results, you can go back and examine the exact piece of equipment used. Explain the precautions that were taken to ensure that the data collected was as trustworthy as possible.
3. Results and Analysis. The results and analysis section should present the data obtained and contain all the calculations and error analysis suggested in the lab manual. Carefully answering all the questions and performing all the calculations suggested in the the “Questions” section of the lab manual will complete this section.
4. Conclusion. The conclusion section of the report should include two parts: a brief summary of the purpose of the experiment, and what the results mean in terms of their relation to the principles of physics being studied. Explain what factors may account for variations or errors in your measurement and if possible make an estimate of the contribution of each source of error to the total error.
5. Presentation and Logical Order. You are encouraged to write your reports on a computer using word processing software and perhaps a mathematical program (like Excel) to help you do calculations and graphical analysis. *If you choose to write your report by hand, please write in ink and not pencil! A neat and organized report is definitely a factor in the lab report grade.* The material in the report should appear in logical order. Try to express yourself clearly and correctly.

# Lab 1H

## Electrostatics

(Physics 7, Experiment #1)

### Objective:

To acquaint the students with the basic principles in electrostatics.

### Foreword:

The most fundamental principle in Electrostatics is stated in what is known as coulomb's law. Coulomb's law states that "like charges repel while unlike charges attract". Furthermore, the law also states that the force of attraction or repulsion varies inversely as the square of the distance between the charges and is directly proportional to the product of the charges, which can be stated mathematically as follows:

$$F = \frac{kq_1q_2}{r^2}$$

Where,

F is the force acting between charges  $Q_1$  and  $Q_2$  in Newton (N);

r is the distance between the two charges in meters (m);

$Q_1$  and  $Q_2$  are the charges of the two bodies in coulomb (c); and

k is the constant of proportionality equal to  $9 \times 10^9 \text{ N m}^2 / \text{c}^2$

### Apparatus:

Plastic rod

Piece of wool

Tiny bits of paper

Cold (tap) water

### Procedure:

NOTE: ALL ACTIVITIES IN THIS EXPERIMENT MAY BE DONE AT HOME

### Part 1:      **Tricks with a comb**

Tear some tiny bits of paper and place them on a table. Rub the comb vigorously with a piece of wool and bring the comb close to tiny pieces of paper.

### **Observation**

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### Explanation

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### **Part 2:**      **Make the water wiggle**

Produce a very fine, continuous stream of water from a faucet. Rub the comb briskly with the wool and bring it close to the stream of water. Move the comb all around in a slow manner and observe.

### Observation

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### Explanation

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### **Part 3:**      **Hair raising experiment**

Comb your hair in front of a mirror and then hold the comb about  $\frac{1}{4}$  inch away from your hair. Make sure that your hair is dry and greaseless.

### Observation

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### Questions and problems

- 1) A  $+10 \mu\text{C}$  charge is 20 cm away from a  $-40 \mu\text{C}$  charge. Determine the field intensity and the electric potential at a point midway between the two charges.
- 2) A  $-10 \mu\text{C}$  charge is 3 cm away from a  $+10 \mu\text{C}$  charge, and is 4 cm to the left from a  $+64 \mu\text{C}$  charge. Find the net force on the  $+10 \mu\text{C}$  charge. The three (3) charges from a straight line.
- 3) A  $-2 \mu\text{C}$  charge is 20 cm away from a  $+10 \mu\text{C}$  charge. Locate the point(s) collinear with the given charges such that the field intensity is zero.