

Module 7 – Ohm’s Law – Instructions

INTRODUCTION

In this experiment, you will study Ohm's Law, the most fundamental relation used in the analysis of electrical circuits. Ohm's Law relates the quantities of voltage, electric current, and resistance in one simple equation.

LEARNING OUTCOMES (FROM SYLLABUS)

- Solve a variety of basic problems in particle kinematics (uniform motion and accelerated motion, including "free fall"), dynamics using Newton's Laws of Motion and the conservation laws of energy and momentum (e.g., collisions), fluid mechanics (including Archimedes' and Bernoulli's Principles), thermodynamics, wave motion, basic electricity (Coulomb's and Ohm's Laws), and radioactive decay.
- Interpret the results of simple experiments and demonstrations of physical principles.

EXPERIMENT SIMULATION

Use this [Experiment Simulation](#) to conduct the experiment according to the instructions in Parts I-II below. Follow the instructions *explicitly*.

WORKSHEET

Please print the worksheet for this experiment. You will need this sheet to record your data.



PART I

Step 1

- a Set Max. Voltage to 10V
- b Set Max. amperage to 100 mA (= 0.1A)

Note: Record your data in the table using the same number of decimal places provided to you by the simulation.

Step 2

- a Reduce resistance to 100 Ω by clicking on **Reduce resistance** button.
- b Increase voltage using the **Increase voltage** button to 10.0 V. Voltage (U) can be read at the bottom right of the green simulation box.
- c Confirm the values of the voltage and current from the simulation with those in Table 1.
- d Increase the resistance to 200 Ω
- e Record the current shown in the simulation in Table 1 (to the number of decimal places shown in the simulation).

Step 3

Repeat **Step 2 d** and **e**, increasing the resistance according to the values in Table 1 and record the current for each resistance value in the Table.

Step 4

Compute the voltage based upon the observed current and given resistance.

PART II

Step 1

- a Set Max. Voltage to 10V
- b Set Max. amperage to 100 mA (= 0.1A)
- c Reduce resistance down to 100 Ω
- d Decrease voltage to 5.00 V

Note: Record your data in the table using the same number of decimal places provided to you by the simulation.

Step 2

- a Record values of voltage and current (U) from the Step 1 conditions in Table 2.
- b Increase the resistance to 200 Ω by clicking on **Increase resistance** button.
- c Record the current shown in the simulation in Table 1 (to the number of decimal places shown in the simulation).

Step 3

Repeat **Step 2 b** and **c**, increasing the resistance according to the values in Table 2 and record the current for each resistance value in the Table.

Step 4

Compute the voltage based upon the observed current and given resistance.

PART III

Step 1

- a Set Max. Voltage to 30V
- b Set Max. amperage to 100 mA (= 0.1A)
- c Reduce resistance down to 100 Ω
- d Increase voltage to 20.00 V

Note: Record your data in the table using the same number of decimal places provided to you by the simulation.

Step 2

- a Record values of voltage and current (U) from the Step 1 conditions in Table 3.
- b Increase the resistance to 200 Ω by clicking on **Increase resistance** button.
- c Record the current shown in the simulation in Table 1 (to the number of decimal places shown in the simulation).

Step 3

Repeat **Step 2 b** and **c**, increasing the resistance according to the values in Table 3 and record the current for each resistance value in the Table.

Step 4

Compute the voltage based upon the observed current and given resistance.

You may utilize the simulation to answer the remaining questions in the WebAssign experiment report.

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