

## Physics: Lab D5 – Conservation of Mechanical Energy of a Pendulum

### *Problem*

Is the law of conservation of mechanical energy valid for a simple pendulum?

### *Prediction*

Formulate a prediction/hypothesis for the problem. Remember to clearly state your reasoning.

### *Experimental Design*

A pendulum of known mass is released from various heights above a reference. A photogate timer is used to measure the instantaneous speed of the pendulum mass at the bottom of its swing. The mechanical energy at the top and bottom positions for the various release heights can be analyzed in order to answer the problem.

### *Pre-Lab Exercise*

1. Provide a definition or explanation of mechanical energy.
2. Write a statement expressing the law of conservation of mechanical energy.
3. What is the potential energy of a 50.0 g mass positioned 10.0 cm above a table?
4. What is the kinetic energy of a 50.0 g mass moving at 4.00 m/s?

### *Materials*

- pendulum mass on string
- pendulum apparatus
- photogate timer
- Vernier LabPro interface
- Ruler

### *Procedure*

Write a clear and detailed list of step-by-step instructions used to perform this investigation.

### *Notes:*

1. *It is recommended that the angle of release of the pendulum always be less than 30°*
2. *It is suggested to use the “Gate” timing mode for the photogate.*

### *Evidence/Analysis*

Create a table to neatly organize and display all measured and calculated values. Provide sample calculations where necessary and include a percent difference analysis.

### *Evaluation*

Complete parts I and II as per Appendix B (handout) guidelines.