Union College Winter 2015

**Physics 120**

**Lab#7: Kinetic Energy and Inertia of Rolling Objects**

1. Open Data Studio, “Create Experiment”, click on port “1”, select “Motion Sensor”, and open

a graph of velocity vs. time and a graph of position vs. time.

2. Set your ramp on a tilt with the motion sensor at the top. Place the hoop near the high end

and let it roll down the ramp while recording data with the motion sensor.

3. (Using the zoom button on the graph tool bar) check that you have a time range over which

both graphs have good looking data and that starts with velocity = 0. Read and record the

starting and final positions and the corresponding final velocity. (Make sure that the start and

end times in the position data are the same as in the velocity data -- you may need to interpolate

between data points). Record these data in Excel.

4. Measure the ratio of change in height to distance along the ramp. Enter this ratio in Excel.

5. Calculate, and record, the change in height of the hoop’s motion.

6. Calculate, and record, the change in gravitational potential energy of the hoop-Earth system.

7. Calculate, and record, the final kinetic energy of the hoop?

8. Do this five times.

9. Does U = -K?

10. Discuss the implication of your results with your partner(s). When confident with your explanation, discuss it with your instructor.

11. Repeat the experiment with the cylinder.

**Analysis:**

Calculate the average and standard error of U + K = 0. Is energy conserved within the

uncertainties?

**For your report,** turn in:

-an abstract

-data table