

Name \_\_\_\_\_  
AP Physics  
Period \_\_\_\_\_

Date \_\_\_\_\_  
Lab Activity #9 (25 pts)  
Mrs. Nadworny

Partners:

Due Date \_\_\_\_\_

## Rotational Motion – Part 2

**NO Lab Write-Up Required**  
*must be neatly written in pencil*

### Purpose

To determine the necessary hanging mass in order for pulley one to take two seconds to fall.

### Materials

Include other necessary equipment.

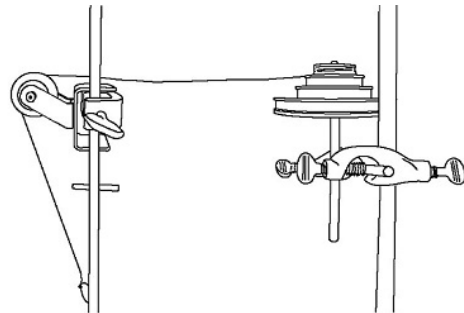
- Balance
  - Pulley with clamp
  - Pulley cord
  - Stopwatch
  -
- Mass set
  - 2 Ring stands
  - Tape measure
  - 4 Pulley Wheel and Axle
  -

(2)

### Diagram

Include other necessary labels on the diagram.

(2)



### Procedure

1. Record the moment of inertia and radius for the smallest pulley from Part 1.
2. Measure the distance from the tabletop to the floor using a tape measure. Record.
3. Cut a piece of thread double the distance measured.
4. Tie a thread around the smallest pulley of the wheel and axle.
5. Attach the wheel and axle to the support stand and rod using the clamp holders. NOTE: The wheel should be parallel to the tabletop.
6. Attach the free pulley to the second support stand and support block.
7. Align the free pulley with the wheel and axle so that the thread, when placed around the pulley, is parallel to the tabletop and is  $90^\circ$  to the occupied wheel.

### Data Collection

Make a clearly labeled table for organizing the raw data that you expect you will collect.

(4)

## Data Analysis

(6)

1. Calculate the acceleration of the (currently) unknown hanging mass if the time of fall is to be two seconds.
2. Calculate the unknown hanging mass necessary to produce the acceleration found in #1.

## Procedure

8. Hang the calculated mass from the loop, then wind the thread clockwise around the first wheel until the line is taut and the bottom of the mass is at the top edge of the table.
9. Release the mass. Measure and record the time it takes to strike the floor.
10. Repeat for two more trials.

## Data Collection

(4)

Make a clearly labeled table for organizing the raw and processed data that you expect you will collect.

## Data Processing

(2)

Calculate the percent error between the experimental time of fall and the predicted time of fall.

## Conclusion

(5)

Attach to the lab, a well-written paragraph that summarizes your results and explains how the differences in values may have occurred (i.e. sources of error).