**General Physics eJournal 3**

**Motion with Constant Acceleration**

**Instructions:**

Follow the Writeup and fill out the eJournal as you complete the lab activities. Submit your eJournal report by uploading the completed WORD or PDF document to our class Learninghub site. If the Learninghub site is down, email the completed report file directly to a lab TA.

**Preliminaries:**

* Title:
* Name(s):
* Date:
* Time In & Out:

**Plan:**

**Hypothesis**

Form a hypothesis regarding the acceleration of an object on an inclined plane as a function of angle. Sketch a hypothetical graph of acceleration vs. the sine of the angle, sinθ, predicting the slope of the graph.

*Insert image of your graph*

**Experiment Outline**

Briefly describe your plan for testing your hypothesis.

**Equipment List**

* List
* Equipment
* Here

**Action:**

Describe the techniques used to collect data by responding to the bullet point questions:

* How did you measure the mass of the car and pennies?
* How did you measure the distance down the track?
* How did you measure the angle of the track?
* How did you measure the downhill component of force?
* How did you measure the time for the runs?

*Insert labeled image of your apparatus*

**Results:**

Record the mass of the car and pennies in kg and the length of the track in meters.

Mass of Car + Pennies: m = \_\_\_\_\_\_\_\_\_\_\_\_ kg

Length of Track: Δx = \_\_\_\_\_\_\_\_\_\_\_\_ m

In Table I, record the angle, downhill force, individual time measurements, and average time for each run. Make sure to record the data with the proper units.

**Table I: Data Collected on Hot Wheels Car Accelerating Down Various Slopes**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Run#** | **θ (degrees)** | **Force (N)** | **t1 (s)** | **t2 (s)** | **t3 (s)** | **Average Time (s)** |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |

**Analysis:**

Calculate the acceleration and sinθ for each run and record them in Table II.

**Table II: (Write appropriate title)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Run#** | **Average Time (s)** | **Acceleration (m/s2)** | **θ (degrees)** | **sin(θ)** |
| 0 | ∞ | 0 | 0 | 0 |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |

Insert a plot of a vs. sinθ and display the linear trendline fit with its slope.

*Insert graph of a vs sin*θ

Slope = \_\_\_\_\_\_\_\_\_\_\_\_ m/s2

Compute the %Error between your slope and the generally accepted value of g (see Eq. 7).

%Error = \_\_\_\_\_\_\_\_\_\_\_\_\_\_%

**Conclusion:**

Discuss how your graphical data and acceleration results compare with your hypothetical predictions. How similar were the results? How close was your experimental value of g to the generally accepted value. Speculate about the possible effect of wheel bearing friction on your results. How might you improve this experiment or explore it further?