Physics 11 Constant Velocity Friction Lab /36

Pre-Lab: This will be checked at the beginning of the lab and is worth 4 marks. /4

In your lab manual do the following 3 steps:

1. Copy the title/name/block/purpose/materials. /4
2. In your own words write a brief paragraph for your procedure summarizing the important steps you will do in the lab. /4
3. Create an **observations table** like the one shown below in the **observations section**. /4

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mass of Block kg | Added Mass kg | Total Mass kg | Normal Force N | Force Applied Trial 1 | Force Applied Trial 1 | Force Applied Trial 1 | Force Applied Trial 1 | Force Applied Trial 1 | Average Force Applied |
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| EXAMPLE ONLY |  |  |  |  |  |  |  |  |  |
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Purpose: To measure the coefficient of kinetic friction for a wooden block on your lab desk.



Materials: wooden block, spring scale, various masses, string

Procedure:

1. Measure the mass of the block and record it in the observations table.
2. Pull the cart along the desk with a **Constant Velocity** using the spring scale and record the Force applied in the table.

IMPORTANT \*Keep the spring scale held horizontally\*

1. Repeat step #2 five times and then calculate the average force applied.



1. Add a 50 gram mass to the cart and record the total mass in the next table.
2. Repeat steps 2 and 3.
3. Repeat steps 4 and 5 until you have 7 to 12 different average forces.
4. Calculate the Normal Forces that act on the different massed boxes and record them in your table.

Where = -9.80 m/s2



Analysis: /4

1. On the attached graph paper, plot **Average Force Applied** (y axis) vs. **Force Normal** (x axis).
2. Make a **best fit line** that goes through the **origin**.
3. Calculate the slope of the **best fit line** on the graph showing important steps and units.
4. Write the **equation of the line,** where y = and x = and b = 0, on the graph.



The general **equation for a line** is



Discussion: /4

1. Draw a free-body diagram of the block and label the forces that it experiences.
2. If you pulled the block with a **constant velocity** what is the acceleration of the block?
3. What is the **net force** on the block?
4. The equation for the force of friction is not , what is the relationship between the applied force and the force of friction for **constant velocity motion**?



Conclusion: In a well written **paragraph** write about the following: /1

1. Was the **purpose** met? What were your results? /1
2. What were the **major sources** of error? /2

Sources means where the error comes from, this could mean you, the equipment or the environment.

1. What are some possible **improvements**? /2

Give **specific changes** to the **procedure** or **equipment** that would lessen the error in the lab.

**Clarity** of **writing and ideas** /2

Formatting: Use your **proper lab format** handout and remember the following important rules: /4

* No pencil, only use one color of pen, either blue or black
* Write the titles in the correct order and underline them with a ruler
* No white-out, if you make a mistake cross it out and do it again.