Lab 10 – Circular Motion

1. Compare your measured slopes for Graphs #1-3 with the expected values. Are they in good agreement? Explain any discrepancies that you observe.

The expected values and the measured slopes are in generally good agreement; for Graph #1 the measured was 1.6901 and the expected was 2, giving us an error of 0.3099. Graph #2’s expected value was 4.21 and the measured value was 5, an error of 0.79. Graph #3’s measured was 6.45 and the expected was 6.38, about 0.07 off. These errors may be attributed to reaction when stopping the software to accurately record the data, and/or the software being a little slow to record accurate data.

1. From the experiment, can you determine whether the coefficient of static friction or kinetic friction is larger? Explain how or why not.

Perhaps, however, that was not something we were looking for when proceeding with the experiment. If we were to do the calculations, theoretically the coefficient of kinetic friction should be less than the coefficient of static friction as it is generally easier to keep something in motion compared to starting from rest to motion.

1. Does your data for the coefficient of static friction agree with the expectation that it does not depend on the mass? Explain any discrepancies that you observe.

Yes, it does, as when the calculations are done using the free body diagram, we see that the mass cancels out in the equation. This indicates that mass has no factor on the coefficient of static friction and therefore the coefficient is not dependent on the mass. From the formula of friction, be it static or kinetic, mass only affects the normal force and not the coefficient of the respective friction. Possible discrepancies that may throw off the data was attempting to find the correct time and velocity before and after the mass flew off the spinning wheel thingy.

1. Discuss any sources of errors in your measurements.

As per the questions above, a few sources of errors include the following. The first source that may have drastically affected our data involves the software being used. The hardware and software we have employed are somewhat redundant and slow. When recording the data, it is sometimes difficult to pinpoint exact values. For example, when looking at angular velocity, we wanted to look for an exact value of the force at an angular velocity of 5, perse. However, the software had only recorded data at 5.05 and 4.95. To obtain a value at 5, we either took a rough guess or found the average of the two values. This is somewhat sketchy and does not provide accurate data which in the long run will throw off the rest of our data by creating unwanted discrepancies. A second source of errors arises from our experimental setup. When setting up the experiment for the different parts of the lab, we attempted to be as accurate as possible by balancing the weights so that there was no extra movement in the beam when left alone. Understandably, we may have some slight errors when balancing the beam out and this may have affected the data by being unbalanced. The third source of errors potentially comes from stopping the recording of the data at the correct instance and looking at the data to correctly determine when the occurrence happened. For example, with Part IV, we tried to stop and examine the data at exactly the time before and after the mass flew of the spinny wheel thingy. However, it was a little hard to accurately pinpoint the exact moment therefore, we took a rough guess, and this may have affected the precision of our measurements.

Human error.

Diagram, schematic

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