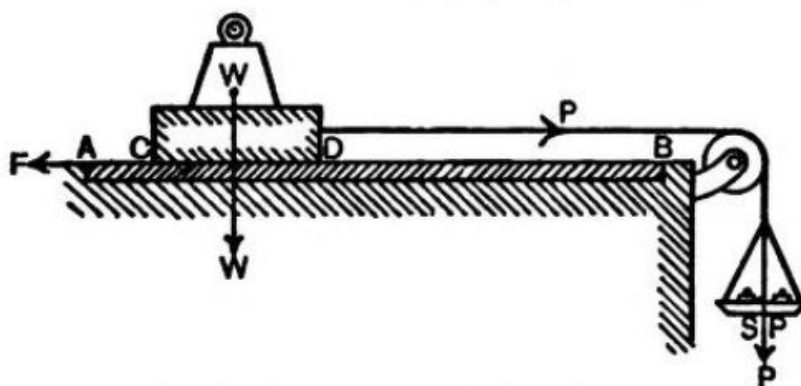


PHY 181: Summer 2023

Measuring the static coefficient of friction.

Name: _____ Group Name: _____ Date: _____



FINDING THE COEFFICIENT OF FRICTION.

The above figure was created by Professor Jamison[1, pg. 67]

1 Instructions

1. Connect a string to the block of wood and the hanging mass.
2. Set the wood on the surface provided and feed the rope over the pulley. Note where the block is placed.
3. Place 300g on top of the block of wood.
4. Add mass onto the hanging mass until the block slides. Do not jolt the system by dropping the masses onto the hanging mass! Be careful, once the block starts to slide it can move quickly. Be ready to catch it. When you put the block back make sure that you put the block back at the same place and that you remove the tension in the string so that the block can settle.
5. Weigh the mass of the block including the mass on top and record it.
6. Weigh the hanging mass including the added mass and record it.
7. Use the formula $\vec{W} = m\vec{g}$ to find the normal force and the force on the object.
8. Since the force on the object is equal to the force of static friction (since it is just about to slide),
 $\mu_s = |F_{sf}|/|F_N|$.
9. Repeat steps 3 to 8 with a 500g mass and then a 700g mass.

2 Analysis

2.1 300g weight

Mass of block and weight: _____

Mass of hanging mass: _____

$$|F_N| = \text{_____}$$

$$|F_{sf}| = \text{_____}$$

$$\mu_s = \text{_____}$$

2.2 500g Weight

Mass of block and weight: _____

Mass of hanging mass: _____

$$|F_N| = \text{_____}$$

$$|F_{sf}| = \text{_____}$$

$$\mu_s = \text{_____}$$

2.3 700g Weight

Mass of block and weight: _____

Mass of hanging mass: _____

$$|F_N| = \text{_____}$$

$$|F_{sf}| = \text{_____}$$

$$\mu_s = \text{_____}$$

3 Conceptual question (will not be graded)

If you had to do the experiment again, what would you improve?

References

- [1] Jamison, Andrew, *A text-book of applied mechanics and mechanical engineering*, London, England: Charles Griffin and Company, Limited, 1903, <https://archive.org/details/atextbookapplied00unkngoog>,