

Raw Data Sheet

Student Name: _____

Team members:

1.- _____ 2.- _____

3.- _____ 4.- _____

Instructor: _____

Acceleration Through an Atwood Machine

Record the masses of each trial, and record the slope of the velocity curve. Make one printout per group to be handed in, and note down the section title. Be sure to write down the units.

Trial 1: m_1 : _____ m_2 : _____ Slope: _____ Plot(v vs. t):

Trial 2: m_1 : _____ m_2 : _____ Slope: _____ Plot(v vs. t):

Trial 3: m_1 : _____ m_2 : _____ Slope: _____ Plot(v vs. t):

Static Friction on a Horizontal Surface

Record the type of surface and the maximum force applied before the 2 kg mass started to move. Make one printout per group to be handed in, and note down the section title along with corresponding surface. Include units.

Surface: _____

Surface: _____

Maximum force: _____

Maximum force: _____

Plot (F vs. t):

Plot (F vs. t):

Kinetic Friction on an Inclined Surface

Record the mass of the wooden block, the inclination angle and the slope of the velocity curve. Make one printout per group to be handed in, and note down the section title. Be sure to write down the units.

m_{block} : _____

Angle: _____

Slope: _____

Plot (v vs. t):

Work Sheet

Introduction¹

Analysis

Acceleration Through an Atwood Machine

1. Draw the free body diagram for this experiment. Be sure to label the masses and the forces.

2. Use $a = g \left(\frac{m_2 - m_1}{m_2 + m_1} \right)$ to calculate the theoretical acceleration for each trial. Label them clearly!

3. Calculate the error percentage for the each trial. Which error percentage is the lowest and why? Explain.

¹This is an adaption from S. Sugaya's original version

Static Friction on a Horizontal Surface

1. Draw the free body diagram for this experiment. Be sure to label the masses and the forces.

2. Use $\mu_s = \frac{|F_{\text{applied}}|}{mg}$ to calculate the coefficient of the static friction for each material you used. Clearly label them. F_{applied} is the maximum force you recorded.

Kinetic Friction on an inclined surface

1. Draw the free body diagram for this experiment. Be sure to label the masses and the forces.

2. Use $\mu_k = \tan\theta - \left|\frac{a}{g}\right| \sec\theta$ to calculate the coefficient of the kinetic friction between the wooden surface and the inclined surface.

3. Considering the previous experiment, would μ_k change with different surfaces? If so, how?

Conclusion