

Your name (BU ID) \_\_\_\_\_ ( )  
 Partner's name \_\_\_\_\_

Date \_\_\_\_\_

**Impulse and Work Lab**  
 PY105  
 Report Sheet

Part I: Impulse and Momentum

Mass of cart 1: \_\_\_\_\_ Mass of cart 2: \_\_\_\_\_ Extra mass: \_\_\_\_\_

Equal masses for Trial 1-3, and unequal masses for Trial 4-5.

Trial	Total Mass 1 ( )	Total Mass 2 ( )	Initial velocity 1 ( )	Initial velocity 2 ( )	Final velocity 1 ( )	Final velocity 2 ( )	$\int \vec{F}_1 dt$ ( )	$\int \vec{F}_2 dt$ ( )
1			+	-				
2			+	0				
3			+	+				
4			+	-				
5			+	0				

(Minimum/Maximum: 0/2.5 points. Minus 0.1 point for each error.)

Calculations

Fill the below momentum chart using your data above.

Trial	$p_{\text{initial},1}$ ( )	$p_{\text{initial},2}$ ( )	$p_{\text{final},1}$ ( )	$p_{\text{final},2}$ ( )	$p_{\text{initial},\text{total}}$ ( )	$p_{\text{final},\text{total}}$ ( )	$\Delta p_1$ ( )	$\Delta p_2$ ( )
1								
2								
3								
4								
5								

(Minimum/Maximum: 0/2.5 points. Minus 0.1 point for each error.)

Your name (BU ID) \_\_\_\_\_ ( ) Date \_\_\_\_\_  
Partner's name \_\_\_\_\_

## Questions

Was the momentum of cart 1 conserved for each trial? (0.2 point) Was the momentum of cart 2 conserved for each trial? (0.2 point)

Allowing for uncertainty due to losses, was the total momentum conserved for each trial? (0.4 point)

What do you notice about the collisions between carts of equal masses? Compare the initial and final velocities of the two carts. (0.4 point)

Allowing for uncertainty due to losses, does the change in momentum equal to impulse ( $\equiv \int \vec{F} dt$ )? (0.4 point)

What are some of the possible sources of error in this experiment? (Few are mentioned in the procedure. You may want to consult your lab instructor.) (0.4 point)

Your name (BU ID) \_\_\_\_\_ ( ) Date \_\_\_\_\_  
Partner's name \_\_\_\_\_

## Part II: Energy and Work

1. In this experiment, we expect only one of the kinetic energy graphs (K vs. time, or K vs. position) to be linear. Select the one that's linear below. (0.4 point)

[ ] K vs. time [ ] K vs. position

(0-0.4 point for each graph below. Minus 0.1 point for each error.)

Sketch the K vs. time graph you observed. Label both axes.	Sketch the K vs. position graph you observed. Label both axes.
---------------------------------------------------------------	-------------------------------------------------------------------

2. Use one or more of the tools  to analyze one of the graphs shown on your screen and determine the effective coefficient of kinetic friction,  $\mu_k$ .

The value of  $\mu_k$  found is \_\_\_\_\_ (0.4 point). The unit of  $\mu_k$  is \_\_\_\_\_ (0.1 point).

Describe clearly how you determined the value of  $\mu_k$ . (0.5 point):

Describe clearly how you will determine the effective coefficient of kinetic friction if the track is inclined at an angle  $\theta$  with the horizontal. (0.8 point)

---

Pre-lab: \_\_\_\_\_ (10×20% = 2 points)

Lab: \_\_\_\_\_ (10×80% = 8 points)

Punctuality + performance \_\_\_\_\_ (1 point)

Report sheet \_\_\_\_\_ (9 point)

TF: \_\_\_\_\_ Grader: \_\_\_\_\_