Physics 110

Ballistic Pendulum Data Sheet

Name____________________ Partner____________________

2 Prelab Exercises

2.1 Derivation of Muzzle Velocity from Projectile Kinematics

2.2 Derivation of Muzzle Velocity from the Ballistic Pendulum

3 Experiment

3.1 Determining Muzzle Velocity from Projectile Kinematics

Trial Number	Horizontal Distance (m)	Deviation (m)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Average		

$x \pm \Delta x$ = ______________________

$y \pm \Delta y$ = ______________________

$v \pm \Delta v$ = ______________________

Calculations:

3.2 Determining Muzzle Velocity Using the Ballistic Pendulum

Trial Number	Angle (Degrees)	Deviation (Degrees)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Average		

$\theta \pm \Delta\theta$ = ______________________

M $\pm$ ΔM = ______________________

m $\pm$ Δm = ______________________

$R_{cm} \pm \Delta R_{cm}$ = ______________________

v $\pm$ Δv = ______________________

Calculations:

4 Questions

1. Do the values for the muzzle velocity determined using the two different methods agree to within experimental uncertainties? Calculate a percent difference.

2. What sources of error are there in this experiment? How much do these errors affect your results?

3. What percentage of the kinetic energy is lost in the collision between the ball and the pendulum? Would it be valid to assume that kinetic energy was conserved in the collision?

4. How does the angle reached by the pendulum change if the ball is not caught by the pendulum? You may test this by turning the pendulum around so the ball strikes the back of the catcher. Is there more energy or less energy transferred to the pendulum?