

Name _____ Instructor name _____

You must show and explain all work neat and organized to receive credit. Please show each step for calculations. YOU MUST TURN IN THIS SHEET to have your assignment graded.

1. (a) Define conditions under which linear momentum is conserved. (b) Find the x – and y – *components* of the momentum of 3.85 kg object moving at 7.23 m/s at an angle of 134° with respect to the positive x – *axis*. (c) Using equation (5) from your Laboratory Manual, show that

$v_{pi} = R_0 \cdot \sqrt{\frac{g}{2H}}$. Why was R_0 used to calculate this velocity? (15 pts)

2. In this experiment, the force of gravity clearly causes both the projectile and the target to accelerate. We still, however, use this situation as an example of a two-dimensional collision where conservation of momentum holds. Explain in detail why this is the case. (2.5 pts)

3. For a two-dimensional elastic collision, two equations are required to express the conservation of momentum, whereas only one equation is required to express the conservation of kinetic energy. Please explain why this is the case. (2.5 pts)