Name:	Student ID:

Physics 9HA DL #12 Lab Report

Answer all the questions below, and include explanations or calculations based on the data to backup your answers in each case.

I. Elastic Collision #1 (equal masses)

1. Consider the impulses delivered to the carts in the collision.
   a. Is Newton's third law, expressed in terms of impulse, confirmed for this collision?

   b. Is the impulse-momentum theorem confirmed?

2. Examine the data in terms of momentum conservation.
   a. Determine whether momentum is conserved using the before and after pinpoint values in the graphs.

   b. Does the momentum of the system appear to remain constant *during* the collision? Should it be? Explain.

3. Examine the data in terms of kinetic energy conservation.
   a. Determine whether kinetic energy is conserved using the before and after pinpoint values in the graphs.

   b. Does the kinetic energy of the system appear to remain constant *during* the collision? Should it be? Explain.

II. Elastic Collision #2 (unequal masses)

4. Consider the impulses delivered to the carts in the collision.
   a. Is Newton's third law, expressed in terms of impulse, confirmed for this collision?

   b. Is the impulse-momentum theorem confirmed?

5. Examine the data in terms of momentum conservation.
   a. Determine whether momentum is conserved using the before and after pinpoint values in the graphs.

   b. Does the momentum of the system appear to remain constant *during* the collision?

6. Examine the data in terms of kinetic energy conservation.
   a. Determine whether kinetic energy is conserved using the before and after pinpoint values in the graphs.

   b. Does the kinetic energy of the system appear to remain constant *during* the collision?

III. Inelastic Collision (*Note: Some of these questions are different from those above*.)

7. Consider the impulses delivered to the carts in the collision.
   a. Is Newton's third law, expressed in terms of impulse, confirmed for this collision?

   b. Is the impulse-momentum theorem confirmed?

   c. In this run there is a small but undeniable dip in the force-vs.-time curve for both carts, just after the main "bump." Interpret what this apparent anomaly is telling us is happening physically.

8. Examine the data in terms of momentum conservation.
   a. Determine whether momentum is conserved using the before and after pinpoint values in the graphs.

   b. Does the momentum of the system appear to remain constant *during* the collision?

9. Examine the data in terms of kinetic energy conservation.
   a. Find the kinetic energy lost using the before and after pinpoint values in the graphs.

   b. Confirm that this matches what is supposed to be lost for such a collision.