1. Of the two quantities Total Linear Momentum Vector and Total Kinetic Energy, which is/are conserved in:

a. Completely inelastic collisions
b. Elastic collisions
c. Collisions that are not elastic, but also not completely inelastic

2. A cart of mass 0.234 kg is placed on a level track. (There is no friction in the world in which this cart and track live.) The cart is given an initial velocity of 1.23 m/s to the right. After traveling the length of the track, the cart collides with a spring that is fixed to the track. After the collision, the cart moves to the left with speed 1.23 m/s.

a. Is this collision elastic? Explain how you know.
b. Is the momentum vector of the cart before the collision equal to the momentum vector of the cart after the collision? Show your calculations of the momentum vectors.
c. But in Part (1) above, you just said that the total linear momentum vector is conserved! What is the resolution to this apparent contradiction?

3. A lighter cart of mass 0.234 +/- 0.002 kg and a heavier cart of mass 0.468 +/- 0.003 kg are placed on a level track. The lighter cart is given an initial velocity, which is measured to be 0.789 +/- 0.011 m/s. The lighter cart collides with the heavier one, and, due to some Velcro™ on the ends of the carts, they move away from the collision with the same velocity. Within what range do you expect to measure the velocity of the two carts after the collision? In other words, please calculate the best estimate of this velocity, and its uncertainty.