Chapter Five Problems:

1. A 70kg man throws a 5kg ball with a velocity of 20 m/s east. What is the velocity of the man?

2. A 50kg cart is initially at rest before it gets cut into two parts. The 30kg part moves west at 40 m/s. What is the velocity of the 20kg part?

3. A 200kg motorbike moves east at 15 m/s. A 50kg rock is dropped straight down into the moving cart. What is the final speed of the motorbike?

4. A constant force of 50N is applied to a 20kg table for 10 seconds. A: What is the impulse acting on the block? B: What is the change in momentum of the table? C: What is the final speed of the table if it was originally at rest? D: What is the final speed of the table if it was originally moving 15 m/s?

5. A 0.20kg rubber ball was struck by a baseball bat from rest up to a speed of 35 m/s. The ball was in contact with the bat for 0.02 seconds. A: What is the change in the momentum of the ball? B: What was the impulse exerted on the ball? C: What was the average force exerted on the ball by the bat?

6. A 0.25kg ball moves east at a speed of 50m/s and strikes a wall. The ball bounces back at 50 m/s as well. The contact time of this interaction was 0.015 seconds. What was the average force exerted?

7. A 10kg toy car moving east at 15 m/s collides with a 5kg toy car at rest. They stick together. What is their final speed?

8. A 25kg bullet is fired horizontally at a speed of 400 m/s into a 1.5 kg surface that is resting horizontally. It emerges at a speed of 150 m/s. What is the final speed?