Chapter 6 Problem Set
Advanced Physics

1. What happens to the kinetic energy in an inelastic collision?

2. What happens to conservation of momentum when a clay ball is thrown against a white board and it sticks?

3. Explain the following using momentum: ninja balls, water rocket, Estes rocket, methanol cannon.

4. What source of error do you now see in the launcher lab from last chapter?

5. Calculate the momentum of the following:
   ❖ An electron moving at 2.55×10^8 m/s.
   ❖ A proton moving at 5.00×10^6 m/s.
   ❖ A 15.0g bullet moving at 300.0m/s.
   ❖ A 75.0kg sprinter moving at 10.0m/s.
   ❖ The earth.

6. A pitcher claims to have thrown a .145kg baseball with the same momentum as a 3.00g bullet traveling at 1.50×10^3 m/s. What is the baseballs speed? What is the KE of both?

7. Using the graph below find the impulse on a 1.5kg object from 0 to 3.0s, 0-5.0s, the speed at 3.0s, the speed at 5.0s.

force(n)
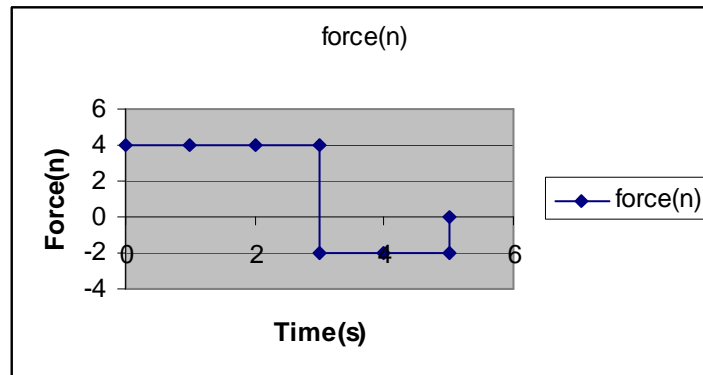
8. A 730n boy from O1 is cutting across the pond in January, trips at the edge and slides out to the middle. He stands up but can get no traction. In an act of sheer desperation throws his 1.2kg Advanced Physics book at 5.0m/s toward the hex. If he is only 5.0m from land, how long will it take for him to get off the ice?

9. Two students from 04 are ice skating on the NO pond. The 65.0kg girl going 2.50m/s throws a .0450kg snowball with a velocity of 30.0m/s east and hits the stationary 60.0kg boy. What is each students velocity after the boy catches the snowball?

10. Three train cars each with a mass of 2.00×10^4kg are on the same track. Two are at rest and connected. The third is rolled into the two at 3.00m/s. What is the loss in KE and where did it go?

11. A .15kg ball is tossed so it reaches its peak 10.0m above a man with a gun. He shoots the ball at the peak of its flight with a .030kg bullet moving with an initial muzzle velocity of 200m/s. If the bullet lodges in the ball, how much higher will the two go?

12. The IMSA Titan football team is defending its unblemished undeleted record. A 90.0kg Titan running 5.0m/s east tackles a 95.0kg opponent going 3.0m/s north. What is the resultant velocity of the two? How much energy is lost?

13. A student is shooting pool in the union. She shoots the cue ball at 5.00m/s at the 8 ball. After the collision the cue ball has a velocity of 4.33m/s 30.0° relative to the line it came in on. Find the velocity of the second ball. Was the collision elastic?