

Assignment 6
Conservation of Momentum

1. A uranium atom at rest disintegrates into two fragments. An alpha particle (helium nucleus) is measured to have a speed of 3×10^5 m/sec. What is the speed of the recoiling atom?
2. A rocket is propelled as a result of the very rapid ejection of exhaust gas from the rear of the rocket. Given that the initial mass of the rocket and fuel is 5000 kg and that 4000 kg of fuel is burned in accelerating the rocket to a speed of 600 m/sec, calculate the velocity of the exhaust gases.
3. A 1 kg hockey puck moving at 0.5 m/sec strikes another puck having a mass of 2 kg such that the 2 kg puck travels at an angle 30° with a speed of 0.10 m/sec with respect to the motion of the original puck.
 - a) What is the final speed of the first puck?
 - b) What is the final direction of the first puck?
4. A 2 gm ball traveling 5 cm/sec hits a 3 gm ball and sticks to it.
 - a) What is the velocity of the combined 5 gm ball?
 - b) What is the kinetic energy before the collision?
 - c) What is the kinetic energy after the collision?
 - d) Can you suggest what happened to the energy?