Physics 30 Worksheet # 4: Conservation of Momentum (2)

1. A 1000 kg car traveling South at 20.0 m/s collides with a 1200 kg car traveling East at 20.0 m/s. The two vehicles entangle after the collision and head off as one. What is the velocity of the combined wreckage immediately after the collision?

2. A 1500 kg car traveling West at 90.0 km/h collides with a 1400 kg truck traveling North at 72.0 km/h. The two vehicles entangle after the collision and head off as one. What is the velocity of the wreckage immediately after the collision?

3. A 4.00 kg ball traveling North with a momentum of 11.2 kg.m/s collides with a 6.0 kg ball traveling West with a momentum of 18 kg.m/s. The two balls stick together and head off as one. What is the momentum of the combined masses? What is the velocity of the combined masses?

4. A 400 kg bomb sitting at rest on a table explodes into three pieces. A 150 kg piece moves off to the East with a velocity of 150 m/s. A 100 kg piece moves off with a velocity of 200 m/s [30.0⁰ S of W]. What is the velocity of the third piece?

5. A bomb sitting at rest on a table explodes into four pieces of equal mass. The first piece travels to the South at a velocity of 55.0 m/s. The second piece travels to the West at a velocity of 80.0 m/s. The third piece travels at a velocity of 40.0 m/s [30.0⁰ W of N]. What is the velocity of the fourth piece?

6. A 200 kg bomb moving at a velocity of 10.0 m/s to the West explode into three pieces. The first piece has a mass of 100 kg and moves to the West with a velocity of 90.0 m/s. The second piece has a mass of 55.0 kg and moves at an angle of 30.0⁰ N of E with a velocity of 55.0 m/s. What is the velocity of the third piece?

7. A stationary 300 kg puck is struck by a 200 g puck moving with a velocity of 2.00 m/s West. After the collision, the 200 g puck has a velocity of 1.00 m/s [53.0⁰ N of W]. Calculate the velocity of the 300 g puck.

8. Two balls of equal mass are involved in a glancing collision. Before the collision, the first ball is moving at a velocity of 1.00 m/s East and the second ball is at rest. After the collision, the first ball is moving at a speed of 5.50 x 10⁻¹ m/s [24.0⁰ S of E]. The second ball heads off at an angle of 24.2⁰ N of E. What is the speed of the second ball after the collision?