#10 #7

Physics 2204

Review Worksheet
Gravitation, Impulse and Momentum

1. Find the force of gravity between a ball of mass 2.0 kg and another ball of mass 5.0 kg if they are separated by 2.0 m.

2. Two objects, each having a mass of 15 kg, experience a gravitational force of attraction of 2.5×10^{-5} N. How far apart are the objects?

3. Two objects experience a gravitational force of attraction of 0.0014 N. If one of the masses is doubled and the separation distance is also doubled, what will the new force of attraction be?

4. What is the momentum of a 55 kg baseball player running at 12 km/h?

5. A golfer hits a ball of mass 42 g, causing it to leave the tee at 35 m/s. What impulse is imparted to the ball by the club? If the club was in contact with the ball for 0.0024 s, what force did the club exert on the ball?

6. A 65 kg parachutist ← moving at 5.3 m/s lands, flexes her knees and rolls in order to stop. What impact force does she experience if the time to stop was 0.80 s? Her identical twin lands without flexing her knees. What force does she experience if her stopping time was 0.050 s? Compare these forces.

7. A train loaded with steel, moving at 90.0 km/h, collides head on with a stationary train of mass 6.0×10^5 kg. If the two trains couple together and move forward with a velocity of 80.0 km/h, find the mass of the train loaded with steel.

8. Two hockey players are initially both at rest on the ice. A 91 kg player pushes a 99 kg player. Find the velocity of the 91 kg player after the push if the 99 kg player moves backward at 9.0 km/h.

9. Ball A (mass 2.0 kg) is rolling to the right at 3.0 m/s. Ball B (mass 4.0 kg) is rolling to the left at 1.0 m/s. They collide and Ball A rebounds at 0.40 m/s to the left. What is the velocity of ball B after the collision?

10. A football player of mass 1.2×10^2 kg is moving at 15 km/h. If he is stopped by a tackle lasting 1.10 s, find,
    a) the change in momentum of the football player.

    b) the force needed to stop the player.