

Physics Problem Set 3.17

Use 10 m/s^2 for g . Ignore air resistance

1. A 2 kg ball is released from 5 meters above the ground.
 - a. How long does it take the ball to land?

 - b. What is the speed of the ball just before landing?

 - c. What is the acceleration of the ball just before landing?

 - d. What is the momentum of the ball just before landing?

 - e. What is the kinetic energy of the ball just before landing?

2. A 1000 kg car starting from rest has an acceleration of 2 m/s^2 .
 - a. How far will the car travel in 5 seconds ?

 - b. What is the speed of the car in 5 seconds ?

 - c. What is the momentum of the car in 5 seconds ?

 - d. What is the net force acting on the car?

 - e. What is the kinetic energy of the car in 5 seconds ?

3. A 2 kg block sliding across a level frictionless surface with a speed of 4 m/s collides with a 4 kg block that is at rest. The blocks stick together and keep moving.
 - a. What is the momentum of the 2 kg block before the collision?

 - b. What is the momentum of the 4 kg block before the collision?

 - c. What is the total momentum of this system before the collision?

 - d. What is the total kinetic energy of this system before the collision?

- e. What is the speed of the blocks after the collision?
- f. What is the total momentum of the blocks after the collision?
- g. What is the total kinetic energy of the blocks after the collision?