PHYSICS 11

NAME: _____

Momentum Review Questions

1. An object is pushed with a force of 6.0 N for 0.5s. What impulse is given to it?

2. What impulse produces a velocity change of 4.0 m/s in a 12.5 kg mass?

3. A freight car with a mass of 40,000 kg is rolling along a level track at 1.40 m/s.
    a) If the largest braking force that could be applied is 500 N, how long would it take to stop the car?

    b) How far would the car move before it stopped?

4. What average force will stop a hammer with a momentum of 48 N.s in 0.030s?

5. A 5000 kg box car runs into a stationary 8000 kg tank car at 3.5 m/s. They connect together and move off down the track. How fast will they travel?

6. A 0.20 kg golf ball moving at 80 m/s hits a 10.0 kg watermelon at rest on a frictionless table and sticks in it. How fast does the watermelon move?

7. A 6.0 kg object at rest explodes into two parts. If part A has mass 2.0 kg and a velocity of 18.0 m/s right, what is the velocity of part B?

8. A 40.0 kg object moving to the right at a velocity of 2.0 m/s collides with a 30.0 kg object moving to the left at a velocity of 5.0 m/s. If the 40.0 kg object moves to the left at a velocity of 2.0 m/s, what is the velocity of the 30.0 kg object? Is this an elastic or inelastic collision?

9. A 0.40 kg ball moving at 7.0 m/s rebounds off a wall with the same speed. What is the impulse given to the wall.

10. A professional golfer can give a golf ball (mass 0.175 kg) an initial velocity of 110 m/s. If the ball is in contact with the club for 0.040 s, calculate the average force applied to the ball when it is hit.

11. A 6.0 kg ball is given an initial velocity of 10 m/s and then is allowed to roll along a floor. A frictional force of 3.0 N opposes its motion. For what length of time will it roll before stopping?

12. What is the momentum of a 80 kg runner who covers 1000 m in 300s running at constant velocity?

13. If an object with a velocity of 30 m/s has the same momentum as that of a 15 kg mass having a velocity of 20 m/s, the mass of the object is…

14. A rubber ball moving at 5.0 m/s collides with a stationary ball of double the mass. After the collision the ball that was initially moving at 5.0 m/s now has a velocity of 2.0 m/s in the opposite direction. What is the velocity of the ball that was originally stationary.

15. An astronaut whose total mass is 80 kg ejects 35.0 grams of gas from his propulsion pack at a speed of 50 m/s. His recoil speed is…

16. A 8000 kg railroad car is coasting on a track at a constant velocity of 10 m/s. As the car coasts under a loading ramp, a 500 kg bale of hay is dropped into it. What is the velocity of the car containing the hay is changed to?

17. A student whose mass is 70.0 kg is on roller skates. The student throws a 5.0 kg medicine ball horizontally away from himself with a speed of 6.0 m/s. Neglecting friction, find the speed of the student after he throws the ball.

Answers:

1. 3.0 Ns
2. 50 kgm/s
3. 112s, 78.4 m
4. 1600 N
5. 1.35 m/s

6. 1.57 m/s
7. -9 m/s, or 9 m/s left
8. 0.33 m/s
9. 5.6 kgm/s

10. 480 N
11. 20 s
12. 267 kgm/s
13. 10 kg
14. 3.5 m/s

15. -0.02 m/s
16. 9.4 m/s
17. -0.43 m/s