

Ch 11 Worksheet Impulse and Momentum HW

Show Gewa for all math problems

1. A car of mass 1100 kg moves at 24 m/s. What braking force is needed to bring the car to a stop in 20.0 s?
1300 N
2. What average force is exerted on a 25 g egg by a bed sheet if the egg hits the sheet at 4.0 m/s and takes 0.25 s to stop? .40 N
3. A 100.0 kg quarterback is traveling 5.0 m/s and is stopped by a tackler in 1.0 s. Calculate (a) the initial momentum of the quarterback, (b) the impulse imparted by the tackler, and (c) the average force exerted by the tackler. A) 5.0×10^2 kgm/s B) 5.0×10^2 Ns C) 5.0×10^2 N
4. Josh kicks a soccer ball initially at rest with an average force of 1620 N. The ball has a mass of 0.450 kg and the time the foot acts on the ball is 0.0150 s. Calculate the speed of the ball after the kick. 54.0 m/s
5. In the hammer throw contest at a track and field event, John whirls a hammer of mass 7.3 kg in a circle and releases it at a speed of 28 m/s. How much impulse acts on the hammer? 2.0×10^2 Ns
6. Karen hits a golf ball of mass 0.045 kg horizontally at 28 m/s. The golf ball hits Scott's truck in the windshield and is in contact with the windshield for 0.010 s. What is the average force of impact on the windshield? 130 N
7. A 25-kg block of ice slides from rest down an inclined plane. If the block of ice slides off the end of the plane with a speed of 6.0 m/s, how much momentum did it gain? 150 kgm/s
8. (a) Calculate the momentum of a 10 kg bowling ball rolling at 2 m/s. (b) Calculate the momentum of a 50 kg box that slides at 4 m/s across an icy surface. a) 20 kgm/s b) 200 kgm/s
9. (a) Calculate the impulse when an average force of 15 N is exerted on a cart for 2.5s. (b) Calculate the impulse when an average force of 12 N acts on a cart for 5.0 s. a) 38 Ns b) 60. Ns
10. A 20.0 kg mass moving at a speed of 3.0 m/s is stopped by a constant force of 15.0 N. How much time does it take to stop the mass? 4.0 s
11. Distinguish between mass and momentum. Which is inertia, and which is inertia in motion?
12. (a) Which has the greater mass, a heavy truck at rest, or a rolling skateboard? (b) Which has greater momentum?
13. Distinguish between force and impulse.
14. A bug and the windshield of a fast moving car collide. Indicate whether each of the following statements is true or false. (a) The forces of impact on the bug and on the car are the same. (b) The impulses on the bug and on the car are the same size. (c) The changes in speed of the bug and the car are the same. (d) The changes in momentum of the bug and the car are the same.
15. In terms of impulse and momentum, why are airbags in automobiles a good thing?

Chapter 11 Collision HW

You must list givens, equations, and show all work.

1. Brad throws his 0.20 kg football in the living room and knocks over his mother's 0.80 kg antique vase. After the collision, the vase moves forward at 2.6 m/s and the football bounces straight back with a speed of 3.9 m/s in the opposite direction. How fast did Brad throw the football? 6.5 m/s
2. Scott, the 82.0 kg physics teacher, runs toward an angry bull at a speed of 4.50 m/s. The 555 kg bull charges toward Scott at 12.0 m/s. At the last moment, Scott jumps and lands on the back of the bull to avoid being trampled. How fast do Scott and the bull move together across the field? 9.88 m/s
3. Jamie and Adam fire a cannon with a mass of 1150 kg. As the 14.5 kg cannonball leaves the cannon, the cannon recoils with a velocity of 1.75 m/s. How fast does the cannonball fly? 139 m/s
4. A 115 kg astronaut, floating next to his spacecraft in deep space, becomes untethered. In order to get back to his craft, he throws an 18 kg tool kit at 4.6 m/s away from the craft. How fast does the astronaut fly back toward the ship? -0.72 m/s
5. In an ice storm, a car of mass 1400 kg travels at 22 m/s and collides with a stationary truck of mass 2800 kg. The two vehicles interlock and slide along the icy road. How fast will the stuck together car and truck be going? 7.33 m/s
6. A 12000 kg truck moving at 12 m/s collides with a 2100 kg car moving in the opposite direction at 29 m/s. If they stick together after impact, how fast, and in what direction will they be moving? 5.9 m/s to right
7. An 8.0 kg bowling ball rolls down the lane at 22 m/s. It collides with a 2.0 kg pin. After the collision, the ball continues moving forward with a velocity of 17 m/s. How fast is the pin moving? $20.\text{ m/s}$
8. Scott and Shannon are ice skating champs. In one of their maneuvers, Shannon skates toward a stationary Scott with a velocity of 4.5 m/s, jumps in the air and does a flip, and lands in the arms of Scott. If Shannon has a mass of 55 kg and Scott has a mass of 85 kg. What will be their velocity after Scott catches Shannon. 1.8 m/s
9. A 45 kg cart rolls along a railroad track at 4.0 m/s. A dog running at 7.6 m/s to catch up with the cart jumps on the cart. After the dog jumps on the cart, the cart is moving at 6.0 m/s. What is the mass of the dog? 56 kg
10. A 0.50 kg ball moving horizontally at 3.0 m/s has a head on collision with a 0.60 kg ball at rest. If the 0.60 kg ball moves forward with a speed of 2.0 m/s, how fast and in what direction is the 0.50 kg ball moving? 0.60 m/s