

momentum - practice problems

1. A 6000 g backpack slides across the floor at 3 m/s after being nudged in a hallway. What is its momentum?

2. A 0.060 kg tennis ball is moving left at 25 m/s just after leaving a racket. The court is 24 m long, but the momentum only depends on mass and velocity. What is the ball's momentum?

3. Which has more momentum: a 45 kg skateboarder moving at 4 m/s or a 12 kg scooter moving at 14 m/s?

4. A 70 kg runner has 420 kg m/s of momentum. How fast is the runner moving?

5. A 2 kg cart speeds up from 1 m/s to 5 m/s. What impulse acted on the cart?

6. A cart has 18 kg m/s of momentum and moves at 3.0 m/s. What force is acting on it?

7. A 75 N force acts on a box for 0.20 s. What impulse is delivered?

8. A 0.50 kg ball is moving right at 12 m/s. It bounces off a wall and leaves moving left at 8 m/s. If the contact time is 0.050 s, what average force acted on the ball? Let right be positive.

9. A 1200 kg car slows from 72 km/h to rest on a dry road. The average braking force is 6000 N opposite the motion, and the car has four passengers. How long does it take to stop?

10. A 0.145 kg baseball is thrown at 90 miles/hour. Convert its speed to m/s, then find its momentum.

11. A 5 kg cart starts from rest. A steady 10 N net force pushes it for 3.0 s. What is the cart's final velocity?

12. A 3 kg object starts from rest and accelerates at 2 m/s^2 for 4 s. What is its momentum after 4 s?

13. An 8 kg sled speeds up from 2 m/s to 11 m/s over 6 s. What average net force acted on it?

14. A 75 kg driver slows from 64.8 km/h to rest during a crash test. Compare the average force if the stopping time is 0.10 s with the average force if an airbag and crumple zone stretch the stopping time to 0.60 s.