

Practice Physics Final Exam – Standards 48–56

- 1) A rubber ball and a lump of putty have equal mass. They are thrown with equal speed against a wall. The ball bounces back with nearly the same speed with which it hit. The putty sticks to the wall. Which object experiences the greater momentum change? 1) _____
- A. the ball
B. the putty
C. Both experience the same momentum change.
D. cannot be determined from the information given
- 2) A rubber ball with a speed of 5.0 m/s collides head-on elastically with an identical ball at rest. What is the speed of the initially stopped ball after the collision? 2) _____
- F. zero
G. 1.0 m/s
H. 2.5 m/s
J. 5.0 m/s
- 3) A railroad car, of mass 200 kg, rolls with negligible friction on a horizontal track with a speed of 10 m/s. A 70-kg stunt man drops straight down a distance of 4.0 m, and lands in the car. How fast will the car be moving after this happens? 3) _____
- A. 7.4 m/s
B. 2.8 m/s
C. 4.7 m/s
D. 10 m/s
- 4) A car of mass 1000 kg moves to the right along a level, straight road at a speed of 6.0 m/s. It collides directly with a stopped motorcycle of mass 200 kg. What is the total momentum after the collision? 4) _____
- F. 6000 kg·m/s to the right
G. zero
H. 10,000 kg·m/s to the right
J. 2000 kg·m/s to the right
- 5) When a cannon fires a cannonball, the cannon will recoil backward because the 5) _____
- A. energy of the cannon is greater than the energy of the cannonball.
B. momentum of the cannonball and cannon is conserved.
C. energy of the cannonball and cannon is conserved.
D. momentum of the cannon is greater than the energy of the cannonball.
- 6) A constant 9.0-N net force acts for 2.0 s on a 6.0-kg object. What is the object's change of velocity? 6) _____
- F. 27 m/s
G. 3.0 m/s
H. 110 m/s
J. 9.0 m/s

- 7) What is the momentum of a 2000-kg truck traveling at 35 m/s? 7) _____
A. 7.0×10^4 kg·m/s
B. 57 kg·m/s
C. 7.0×10^5 kg·m/s
D. 3.5×10^4 kg·m/s
- 8) Two equal mass balls (one red and the other blue) are dropped from the same height, and rebound off the floor. The red ball rebounds to a higher position. Which ball is subjected to the greater magnitude of impulse during its collision with the floor? 8) _____
F. It's impossible to tell since the time intervals and forces are unknown.
G. Both balls were subjected to the same magnitude impulse.
H. the blue ball
J. the red ball
- 9) A small object with momentum 5.0 kg·m/s approaches head-on a large object at rest. The small object bounces straight back with a momentum of magnitude 4.0 kg·m/s. What is the magnitude of the large object's momentum change? 9) _____
A. 5.0 kg·m/s
B. 4.0 kg·m/s
C. 9.0 kg·m/s
D. 1.0 kg·m/s
- 10) In a game of pool, the white cue ball hits the #5 ball and stops, while the #5 ball moves away with the same velocity as the cue ball had originally. The type of collision is 10) _____
F. inelastic.
G. completely inelastic.
H. elastic.
J. any of the above, depending on the mass of the balls.
- 11) A golf ball traveling 3.0 m/s to the right collides in a head-on collision with a stationary bowling ball in a friction-free environment. If the collision is perfectly elastic, the speed of the golf ball immediately after the collision is 11) _____
A. much less than 3.0 m/s.
B. slightly greater than 3.0 m/s.
C. equal to 3.0 m/s.
D. slightly less than 3.0 m/s.
- 12) A 1200-kg ferryboat is moving south at 20 m/s. What is the magnitude of its momentum? 12) _____
F. 1.7×10^{-3} kg·m/s
G. 6.0×10^2 kg·m/s
H. 2.4×10^4 kg·m/s
J. 2.4×10^3 kg·m/s
- 13) A Ping-Pong ball moving east at a speed of 4 m/s, collides with a stationary bowling ball. The Ping-Pong ball bounces back to the west, and the bowling ball moves very slowly to the east. Which object experiences the greater magnitude impulse during the collision? 13) _____
A. Neither; both experienced the same magnitude impulse.
B. the Ping-Pong ball
C. the bowling ball
D. It's impossible to tell since the velocities after the collision are unknown.

- 14) A 2.0-kg mass moves with a speed of 5.0 m/s. It collides head-on with a 3.0 kg mass at rest. If the collision is perfectly inelastic, what is the speed of the masses after the collision? 14) _____
- F. 10 m/s
 - G. 2.0 m/s
 - H. 2.5 m/s
 - J. 0, since the collision is inelastic
- 15) A freight car moves along a frictionless level railroad track at constant speed. The car is open on top. A large load of coal is suddenly dumped into the car. What happens to the velocity of the car? 15) _____
- A. It decreases.
 - B. It remains the same.
 - C. It increases.
 - D. cannot be determined from the information given
- 16) When a light beach ball rolling with a speed of 6.0 m/s collides with a heavy exercise ball at rest, the beach ball's speed after the collision will be, approximately, 16) _____
- F. 3.0 m/s.
 - G. 12 m/s.
 - H. 6.0 m/s.
 - J. 0.
- 17) A handball of mass 0.10 kg, traveling horizontally at 30 m/s, strikes a wall and rebounds at 24 m/s. What is the change in the momentum of the ball? 17) _____
- A. 0.60 kg·m/s
 - B. 1.2 kg·m/s
 - C. 5.4 kg·m/s
 - D. 72 kg·m/s
- 18) A railroad freight car, mass 15,000 kg, is allowed to coast along a level track at a speed of 2.0 m/s. It collides and couples with a 50,000-kg second car, initially at rest and with brakes released. What is the speed of the two cars after coupling? 18) _____
- F. 0.46 m/s
 - G. 0.60 m/s
 - H. 1.2 m/s
 - J. 1.8 m/s

19. A 2500 kg car is driving at a velocity of 25 m/s. The car suddenly hits a tree and stops. If the car stops in 0.2 seconds calculate the force the tree exerts on the car.

What do you know?	
What formula?	
Substitute in values	
Calculations	
Answer	

20. Two bumper cars head towards each other and experience an elastic collision. Car A has a mass of 400 kg and Car B has a mass of 600 kg. Car A has an initial velocity 4 m/s and Car B had an initial velocity of -2 m/s. Car B had a final velocity of 2.8 m/s. What is the final velocity of Car A?

What do you know?	
What formula?	
Substitute in values	
Calculations	
Answer	