

**AP physics C Web Review Ch 6 Momentum****Please do not write on my tests****Multiple Choice***Identify the choice that best completes the statement or answers the question.*

- \_\_\_\_\_ 1. The dimensional equivalent of the quantity impulse in terms of the fundamental quantities (mass, length, time) is which of the following?
- $MLT^{-1}$
  - $ML^2T^{-2}$
  - $MLT$
  - $MLT^{-2}$
  - $ML^2T$
- \_\_\_\_\_ 2. The impulse experienced by a body is equivalent to its change in:
- velocity.
  - kinetic energy.
  - momentum.
  - potential energy.
  - None of the above choices are valid.
- \_\_\_\_\_ 3. Alex throws a 0.15-kg rubber ball down onto the floor. The ball's speed just before impact is 6.5 m/s, and just after is 3.5 m/s. What is the change in the magnitude of the ball's momentum?
- 0.09 kg·m/s
  - 1.5 kg·m/s
  - 4.3 kg·m/s
  - 5.7 kg·m/s
  - 126 kg·m/s
- \_\_\_\_\_ 4. Alex throws a 0.15-kg rubber ball down onto the floor. The ball's speed just before impact is 6.5 m/s, and just after is 3.5 m/s. If the ball is in contact with the floor for 0.025 s, what is the magnitude of the average force applied by the floor on the ball?
- 60 N
  - 133 N
  - 3.0 N
  - 3.5 N
  - 87 N
- \_\_\_\_\_ 5. A crane drops a 0.30 kg steel ball onto a steel plate. The ball's speeds just before impact and after are 4.5 m/s and 4.2 m/s, respectively. If the ball is in contact with the plate for 0.030 s, what is the magnitude of the average force that the ball exerts on the plate during impact?
- 87 N
  - 133 N
  - 3.0 N
  - 3.5 N
  - 60 N

- \_\_\_\_\_ 6. Jerome pitches a baseball of mass 0.20 kg. The ball arrives at home plate with a speed of 40 m/s and is batted straight back to Jerome with a return speed of 60 m/s. What is the magnitude of change in the ball's momentum?
- 4.0 kg·m/s
  - 8.0 kg·m/s
  - 18 kg·m/s
  - 20 kg·m/s
  - 24 kg·m/s
- \_\_\_\_\_ 7. The units of impulse are equivalent to:
- those of energy.
  - N·m.
  - kg·m/s.
  - those of force.
  - N/m.
- \_\_\_\_\_ 8. A miniature spring-loaded, radio-controlled gun is mounted on an air puck. The gun's bullet has a mass of 5.00 g, and the gun and puck have a combined mass of 120 g. With the system initially at rest, the radio controlled trigger releases the bullet causing the puck and empty gun to move with a speed of 0.500 m/s. What is the bullet's speed?
- 4.80 m/s
  - 11.5 m/s
  - 48.0 m/s
  - 12.0 m/s
  - 23.0 m/s
- \_\_\_\_\_ 9. If the momentum of an object is tripled, its kinetic energy will change by what factor?
- zero
  - one-third
  - three
  - nine
  - None of the above.
- \_\_\_\_\_ 10. A moderate force will break an egg. However, an egg dropped on the road usually breaks, while one dropped on the grass usually doesn't break. This is because for the egg dropped on the grass:
- the change in momentum is greater.
  - the change in momentum is less.
  - the time interval for stopping is greater.
  - the time interval for stopping is less.
  - Both choices A and C are valid.
- \_\_\_\_\_ 11. Three satellites are launched into space connected together. Once in deep space, an explosive charge separates the three satellites and they move apart. The satellites each have different masses with  $m_1 < m_2 < m_3$ . Which of the following statements is always true?
- The one with mass  $m_1$  receives the greatest impulse.
  - The one with mass  $m_3$  receives the greatest impulse.
  - The all must receive equal impulses.
  - Although one or more of the above statements could be true in special cases, they are not always true.
  - All of the above statements are always false.

- \_\_\_\_\_ 12. A 20-g bullet moving at 1 000 m/s is fired through a one-kg block of wood emerging at a speed of 100 m/s. If the block had been originally at rest and is free to move, what is its resulting speed?
- 9 m/s
  - 18 m/s
  - 90 m/s
  - 230 m/s
  - 900 m/s
- \_\_\_\_\_ 13. During a snowball fight two balls with masses of 0.4 and 0.6 kg, respectively, are thrown in such a manner that they meet head-on and combine to form a single mass. The magnitude of initial velocity for each is 15 m/s. What is the speed of the 1.0-kg mass immediately after collision?
- zero
  - 3 m/s
  - 6 m/s
  - 9 m/s
  - 10 m/s
- \_\_\_\_\_ 14. A 2 500-kg truck moving at 10.00 m/s strikes a car waiting at a traffic light, hooking bumpers. The two continue to move together at 7.00 m/s. What was the mass of the struck car?
- 1 730 kg
  - 1 550 kg
  - 1 200 kg
  - 1 070 kg
  - 967 kg
- \_\_\_\_\_ 15. A billiard ball collides in an elastic head-on collision with a second stationary identical ball. After the collision which of the following conditions applies to the first ball?
- maintains the same velocity as before
  - has one half its initial velocity
  - comes to rest
  - moves in the opposite direction
  - Both choices B and D are valid.
- \_\_\_\_\_ 16. A billiard ball collides in an elastic head-on collision with a second identical ball. What is the kinetic energy of the system after the collision compared to that before collision?
- the same as
  - one fourth
  - twice
  - four times
  - None of the above choices are valid.
- \_\_\_\_\_ 17. 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 loaded second car, initially at rest and with brakes released. What percentage of the initial kinetic energy of the 15 000-kg car is preserved in the two-coupled cars after collision?
- 14%
  - 23%
  - 86%
  - 92%
  - 100%

Name: \_\_\_\_\_

ID: A

- \_\_\_\_\_ 18. A 20-kg object sitting at rest is struck elastically in a head-on collision with a 10-kg object initially moving at +3.0 m/s. Find the final velocity of the 20-kg object after the collision.
- a. -1.0 m/s
  - b. -2.0 m/s
  - c. +1.5 m/s
  - d. +2.0 m/s
  - e. -1.5 m/s
- \_\_\_\_\_ 19. A 7.0-kg bowling ball strikes a 2.0-kg pin. The pin flies forward with a velocity of 6.0 m/s; the ball continues forward at 4.0 m/s. What was the original velocity of the ball?
- a. 4.0 m/s
  - b. 5.7 m/s
  - c. 6.6 m/s
  - d. 3.3 m/s
  - e. 2.8 m/s
- \_\_\_\_\_ 20. Two skaters, both of mass 75 kg, are on skates on a frictionless ice pond. One skater throws a 0.3-kg ball at 5 m/s to his friend, who catches it and throws it back at 5 m/s. When the first skater has caught the returned ball, what is the velocity of each of the two skaters?
- a. 0.02 m/s, moving apart
  - b. 0.04 m/s, moving apart
  - c. 0.02 m/s, moving towards each other
  - d. 0.04 m/s, moving towards each other
  - e. 0.05 m/s, moving apart

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Answer Section**

**MULTIPLE CHOICE**

1. A
2. C
3. B
4. A
5. A
6. D
7. C
8. D
9. D
10. C
11. D
12. B
13. B
14. D
15. C
16. A
17. B
18. D
19. B
20. B