

Ch7MidYrReview

- 7.1 Conceptual Questions

- _____ 1) A rubber ball and a lump of clay 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 clay sticks to the wall. Which one of these objects experiences the greater momentum change?
- A) the ball
 - B) the clay
 - C) Both of them experience the same non-zero momentum change.
 - D) Both of them experience zero momentum change.
- _____ 2) Which of the following quantities are units of momentum? (There could be more than one correct choice.)
- A) $\text{N} \cdot \text{m}$
 - B) $\text{kg} \cdot \text{s/m}$
 - C) $\text{kg} \cdot \text{m/s}$
 - D) $\text{N} \cdot \text{s}$
 - E) $\text{kg} \cdot \text{m}^2/\text{s}^2$
- _____ 3) A tiger is running in a straight line. If we double both the mass and speed of the tiger, the magnitude of its momentum will increase by what factor?
- A) $\sqrt{2}$
 - B) 2
 - C) 4
 - D) 8
 - E) 16
- _____ 4) A very elastic rubber ball is dropped from a certain height and hits the floor with a downward speed v . Since it is so elastic, the ball bounces back with the same speed v going upward. Which of the following statements about the bounce are correct? (There could be more than one correct choice.)
- A) The ball had the same momentum just before and just after the bounce.
 - B) The magnitude of the ball's momentum was the same just before and just after the bounce.
 - C) The ball's momentum was conserved during the bounce.
 - D) None of the above statements are correct.
- _____ 5) The momentum of an isolated system is conserved
- A) only in inelastic collisions.
 - B) only in elastic collisions.
 - C) in both elastic and inelastic collisions.
- _____ 6) Two friends are standing on opposite ends of a canoe that is initially at rest with respect to a frictionless lake. The person in the front throws a very massive ball toward the back, and the person in the back catches it. After the ball is caught, the canoe is
- A) moving backward.
 - B) stationary.
 - C) moving forward.

- _____ 7) You are standing on a skateboard, initially at rest. A friend throws a very heavy ball towards you. You have two choices about what to do with the ball: either catch the ball or deflect it back toward your friend with the same speed as it was originally thrown. Which choice should you make in order to maximize your speed on the skateboard?
- A) Catch the ball.
 - B) Deflect the ball back.
 - C) Your final speed on the skateboard will be the same regardless whether you catch the ball or deflect the ball.
- _____ 8) A small car meshes with a large truck in a head-on collision. Which of the following statements concerning the momentum during the collision are correct? (There could be more than one correct choice.)
- A) The momentum of the truck is conserved.
 - B) The momentum of the car is conserved.
 - C) The car and the truck must undergo the same change in speed.
 - D) The momentum of the car and the momentum of the truck are each conserved.
 - E) The momentum of the car-truck system is conserved, but the momentum of each one separately is not conserved.
- _____ 9) A rocket explodes into two fragments, one 25 times heavier than the other. The magnitude of the momentum change of the lighter fragment is
- A) 25 times as great as the momentum change of the heavier fragment.
 - B) The same as the momentum change of the heavier fragment.
 - C) $1/25$ as great as the momentum change of the heavier fragment.
 - D) 5 times as great as the momentum change of the heavier fragment.
 - E) $1/4$ as great as the momentum change of the heavier fragment.
- _____ 10) Which of the following quantities are units of impulse? (There could be more than one correct choice.)
- A) $\text{N} \cdot \text{m}$
 - B) $\text{kg} \cdot \text{s}/\text{m}$
 - C) $\text{kg} \cdot \text{m}/\text{s}$
 - D) $\text{N} \cdot \text{s}$
 - E) $\text{kg} \cdot \text{m}^2/\text{s}^2$
- _____ 11) During World War I, Germany used a "Big Bertha" cannon to hurl shells into Paris 30 miles away. This gun also had a very long barrel. What was the reason for using a long barrel in these guns?
- A) to exert a larger force on the shells
 - B) to reduce frictional losses
 - C) to allow the force of the expanding gases from the gunpowder to act for a longer time
 - D) to increase the force exerted on the bullet due to the expanding gases from the gunpowder
 - E) to reduce the force exerted on the bullet due to the expanding gases from the gunpowder

- _____ 12) In a collision between two unequal masses, which mass receives a greater magnitude impulse?
A) the larger mass
B) the smaller mass
C) They receive equal impulses.
- _____ 13) Identical forces act for the same length of time on two different objects. The magnitude of the change in momentum of the lighter object is
A) smaller than the magnitude of the change in momentum of the larger mass, but not zero.
B) larger than the magnitude of the change in momentum of the larger mass.
C) exactly equal to the magnitude of the change in momentum of the larger mass.
D) zero.
E) There is not enough information to answer the question.
- _____ 14) A very light ping-pong ball moving east at a speed of 4 m/s collides with a very heavy 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?
A) Neither; both experienced the same magnitude impulse.
B) the Ping-Pong ball
C) the bowling ball
D) It is impossible to tell since the actual mass values are not given.
E) It is impossible to tell since the velocities after the collision are unknown.
- _____ 15) A firecracker explodes in midair and breaks up into many fragments. Which of the following statements are true regarding conditions immediately before and immediately after the explosion:
I. The total momentum of the fragments is equal to the original momentum of the firecracker.
II. The total kinetic energy of the fragments is equal to the original kinetic energy of the firecracker.
A) Statement I only
B) Statement II only
C) Both Statement I and Statement II
D) Neither statement is true.

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Answer Section

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|---------------|--------|-------------|
| 1) ANS: A | PTS: 1 | REF: Var: 1 |
| 2) ANS: C, D | PTS: 1 | REF: Var: 1 |
| 3) ANS: C | PTS: 1 | REF: Var: 1 |
| 4) ANS: B | PTS: 1 | REF: Var: 1 |
| 5) ANS: C | PTS: 1 | REF: Var: 1 |
| 6) ANS: B | PTS: 1 | REF: Var: 1 |
| 7) ANS: B | PTS: 1 | REF: Var: 1 |
| 8) ANS: E | PTS: 1 | REF: Var: 1 |
| 9) ANS: B | PTS: 1 | REF: Var: 1 |
| 10) ANS: C, D | PTS: 1 | REF: Var: 1 |
| 11) ANS: C | PTS: 1 | REF: Var: 1 |
| 12) ANS: C | PTS: 1 | REF: Var: 1 |
| 13) ANS: C | PTS: 1 | REF: Var: 1 |
| 14) ANS: A | PTS: 1 | REF: Var: 1 |
| 15) ANS: A | PTS: 1 | REF: Var: 1 |