

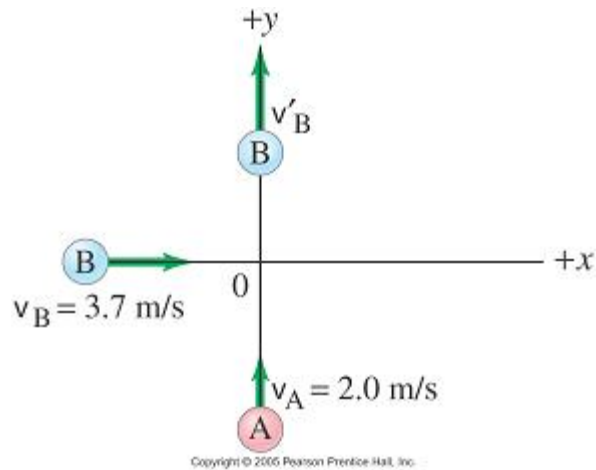
**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) When a cannon fires a cannonball, the cannon will recoil backward because the \_\_\_\_\_ 1) \_\_\_\_\_  
A) energy of the cannonball and cannon is conserved.  
B) momentum of the cannon is greater than the energy of the cannonball.  
C) momentum of the cannonball and cannon is conserved.  
D) energy of the cannon is greater than the energy of the cannonball.
- 2) A 3.0-kg object moves to the right at 4.0 m/s. It collides head-on with a 6.0-kg object moving to the left at 2.0 m/s. Which statement is correct? 2) \_\_\_\_\_  
A) The total momentum both before and after the collision is zero.  
B) The total momentum both before and after the collision is 24 kg·m/s.  
C) The total momentum before the collision is 24 kg·m/s, and after the collision is 0 kg·m/s.  
D) None of the above is true.
- 3) 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 objects experiences the greater momentum change? 3) \_\_\_\_\_  
A) the ball  
B) the putty  
C) Both experience the same momentum change.  
D) cannot be determined from the information given
- 4) 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 4) \_\_\_\_\_  
A) inelastic.  
B) completely inelastic.  
C) elastic.  
D) any of the above, depending on the mass of the balls.
- 5) 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 almost perfectly elastic, the speed of the golf ball immediately after the collision is 5) \_\_\_\_\_  
A) much less than 3.0 m/s.                      B) equal to 3.0 m/s.  
C) slightly less than 3.0 m/s.                      D) slightly greater than 3.0 m/s.
- 6) In an inelastic collision, if the momentum is conserved, then which of the following statements is true about kinetic energy? 6) \_\_\_\_\_  
A) Kinetic energy is also conserved.                      B) Kinetic energy is lost.  
C) Kinetic energy is gained.                      D) none of the above

- 7) A very heavy object moving with velocity  $v$  collides head-on with a very light object moving with velocity  $-v$ . The collision is elastic, and there is no friction. The heavy object barely slows down. What is the speed of the light object after the collision? 7) \_\_\_\_\_  
 A) nearly  $v$                       B) nearly infinite                      C) nearly  $3v$                       D) nearly  $2v$
- 8) A small object collides with a large object and sticks. Which object experiences the larger magnitude of momentum change? 8) \_\_\_\_\_  
 A) the small object  
 B) the large object  
 C) Both objects experience the same magnitude of momentum change.  
 D) cannot be determined from the information given
- 9) A rubber ball with a speed of  $5.0 \text{ m/s}$  collides head-on elastically with an identical ball at rest. What is the speed of the initially stopped ball after the collision? 9) \_\_\_\_\_  
 A)  $1.0 \text{ m/s}$                       B)  $5.0 \text{ m/s}$                       C)  $2.5 \text{ m/s}$                       D) zero
- 10) If you pitch a baseball with twice the kinetic energy you gave it in the previous pitch, the magnitude of its momentum is 10) \_\_\_\_\_  
 A) 1.41 times as much.                      B) the same.  
 C) 4 times as much.                      D) doubled.
- 11) A  $100\text{-kg}$  football linebacker moving at  $2.0 \text{ m/s}$  tackles head-on an  $80\text{-kg}$  halfback running  $3.0 \text{ m/s}$ . Neglecting the effects due to digging in of cleats, 11) \_\_\_\_\_  
 A) neither player will drive the other backward.  
 B) the halfback will drive the linebacker backward.  
 C) the linebacker will drive the halfback backward.  
 D) this is a simple example of an elastic collision.
- 12) 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? 12) \_\_\_\_\_  
 A) It's impossible to tell since the time intervals and forces are unknown.  
 B) Both balls were subjected to the same magnitude impulse.  
 C) the red ball  
 D) the blue ball

**ESSAY. Write your answer in the space provided or on a separate sheet of paper.**

- 13) A  $975\text{-kg}$  two stage rocket is traveling at a speed of  $5.80 \times 10^3 \text{ m/s}$  with respect to Earth when a pre-designed explosion separates the rocket into two sections of equal mass that then move at a speed of  $2.20 \times 10^3 \text{ m/s}$  relative to each other along the original line of motion. (a) What are the speed and direction of each section (relative to Earth) after the explosion? (b) How much energy was supplied by the explosion? [Hint: What is the change in KE as a result of the explosion?]



**FIGURE 7-37**

- 14) Two billiard balls of equal mass move at right angles and meet at the origin of an  $xy$  coordinate system. Ball A is moving upward along the  $y$  axis at  $2.0 \text{ m/s}$ , and ball B is moving to the right along the  $x$  axis with speed  $3.7 \text{ m/s}$ . After the collision, assumed elastic, ball B is moving along the positive  $y$  axis (Fig. 7-37). What is the final direction of ball A and what are their two speeds?

## Answer Key

Testname: CH\_7\_PRACTICE\_TEST

- 1) C
- 2) A
- 3) A
- 4) C
- 5) C
- 6) B
- 7) C
- 8) C
- 9) B
- 10) A
- 11) B
- 12) C
- 13) (a)  $6.9 \times 10^3$  m/s, away from the Earth;  $4.7 \times 10^3$  m/s, away from the Earth  
(b)  $5.9 \times 10^8$  J
- 14) The final direction of A is the  $x$  direction. 3.7 m/s, 2.0 m/s