Two-Dimensional Motion and Vectors

Section Quiz: Projectile Motion

Write the letter of the correct answer in the space provided.

_____ 1. Which of the following may be classified as projectile motion?
a. a punted football
b. a thrown baseball
c. a water droplet cascading down a waterfall
d. all of the above

_____ 2. In the absence of air resistance, the path of a projectile is a(n)
a. parabola.
b. arc.
c. polygon.
d. semicircle.

_____ 3. The motion of a projectile in free fall is characterized by
a. $a_x = a_y = -g$.
b. a_x = constant and v_y = constant.
c. v_x = constant and $a_y = -g$.
d. v_x = constant and v_y = constant.

_____ 4. For an object to be a projectile, it must be in free fall and its initial velocity must
a. have a horizontal component.
b. have both a vertical and a horizontal component.
c. have either a vertical or a horizontal component.
d. start from rest.

_____ 5. A baby drops a ball from her hand resting on the serving tray of her high chair. Simultaneously, she knocks another ball from the same tray. Which of the following statements are true?
I. Both balls strike the ground at the same time.
II. The dropped ball reaches the ground first.
III. The knocked ball reaches the ground first.
IV. Both balls strike the ground at the same speed.
a. I only
b. II only
c. III only
d. I and IV

_____ 6. A gardener holds the nozzle of a hose constant at a small angle above the horizontal and observes the path of the stream of water coming from the nozzle. If the pressure of the water is increased so that the water leaves the nozzle at a greater speed,
   a. the height and width of the water's path will increase.
   b. the height of the water's path will increase but the width of the path will remain the same.
   c. the width of the water's path will increase but the height will remain the same.
   d. The height and width of the water's path will remain the same.

_____ 7. Assuming no air friction and $a_y = -g$, the horizontal displacement of a projectile depends on the
   a. horizontal component of its initial velocity only.
   b. vertical component of its initial velocity only.
   c. vertical component of its initial velocity and its time in flight.
   d. vertical component and the horizontal component of its initial velocity.

_____ 8. A volleyball player taps a volleyball well above the net. The ball's speed is least
   a. just after it is tapped by the player.
   b. at the highest point of its path.
   c. just before it strikes the ground.
   d. when the horizontal and vertical components of its velocity are equal.

9. Explain how a projectile can have a horizontal displacement even though its vertical displacement is zero.

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10. In a movie production, a stunt person must leap from a balcony of one building to a balcony 3.0 m lower on another building. If the buildings are 2.0 m apart, what is the minimum horizontal velocity the stunt person must have to accomplish the jump? Assume no air resistance and that $a_y = -g = -9.81\ \text{m/s}^2$.