Review

1. A projectile is fired with an initial speed of 1000 m/s at an angle of 37º above the horizontal. If air resistance is neglected, the horizontal component of the projectile's velocity after 20 s is approximately

A) 600 m/s B) 800 m/s C) 640 m/s D) 40 m/s E) 160 m/s

2. Which of the following statements is not true of a projectile moving near the surface of the earth against negligible air resistance?

A) The horizontal velocity is constant.

B) The vertical acceleration is constant.

C) The horizontal displacement is directly proportional to the time of flight.

D) The vertical velocity at any given time is independent of the angle of projection.

E) The horizontal acceleration is constant.

3. A golfer drives her ball from the tee down the fairway in a high arcing shot. When the ball is at the highest point of its flight,

A) its velocity and acceleration are both zero.

B) its velocity is zero but its acceleration is nonzero.

C) its velocity is nonzero but its acceleration is zero.

D) its velocity and acceleration are both nonzero.

E) Insufficient information is given to answer correctly.

4. To determine the height of a football stadium, Aaron climbs to the top of a stadium and drops a rock. When releasing it, he starts counting, “one Mississippi, two Mississippi, three Mississippi….” until he sees the rock hit the ground. How high would you estimate a “three Mississippi” high stadium to be? (“one Mississippi is one second)

A. 15 m

B. 20 m

C. 30 m

D. 45 m

E. 60 m

5. A baseball is hit upward and travels along a parabolic arc before it strikes the ground. Which one of the following statements is necessarily true?

A) The acceleration of the ball decreases as the ball moves upward.

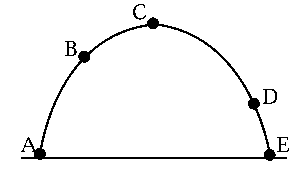
B) The velocity of the ball is zero when the ball is at the highest point in the arc.

C) The acceleration of the ball is 0 m/s2 when the ball is at the highest point in the arc.

D) The *x*-component of the velocity of the ball is the same throughout the ball's flight.

E) The velocity of the ball is a maximum when the ball is at the highest point in the arc.

Use the following to answer questions 6-8:



6. The figure represents the parabolic trajectory of a ball going from A to E in earth gravity but without air resistance. What is the direction of the acceleration at point B?

A) It is up and to the right. D) It is straight down.

B) It is down and to the left. E) The acceleration of the ball is zero.

C) It is straight up.

7. The figure represents the parabolic trajectory of a ball going from A to E in earth gravity but without air resistance. What is the direction of the acceleration at point C?

A) It is to the right. D) It is straight down.

B) It is to the left. E) The acceleration of the ball is zero.

C) It is straight up.

8. The figure represents the parabolic trajectory of a ball going from A to E. What is the speed at point C compared with that at point A?

A) It is greater at C than at A.

B) It is less at C than at A.

C) The speeds are identical.

D) The speeds are both zero.

E) It is not possible to answer this question without more information.

Use the following to answer questions 9-11:

A projectile is fired at an angle of 60.0° above the horizontal with an initial speed of 30.0 m/s.

9. What is the magnitude of the *horizontal* component of the projectile's displacement at the end of 2 s?

A) 30 m B) 40 m C) 10 m D) 20 m E) 50 m

10. How long does it take the projectile to reach the highest point in its trajectory?

A) 1.5 s B) 2.7 s C) 4.0 s D) 6.2 s E) 9.8 s

11. A quarterback throws a pass at an angle of 35° above the horizontal with an initial speed of 25 m/s. The ball is caught by the receiver 2.55 seconds later. Determine the distance the ball was thrown.

A) 13 m B) 18 m C) 36 m D) 52 m E) 72 m

12. A cannonball is aimed 30.0° above the horizontal and is fired with an initial speed of 125 m/s at ground level. How far away from the cannon will the cannonball hit the ground?

A) 125 m

B) 138 m

C) 695 m

D) 1040 m

E) 1380 m

Use the following to answer questions 13-14

A football is kicked with a speed of 18 m/s at an angle of 65° to the horizontal.

13. What are the respective *horizontal* and *vertical* components of the initial velocity of the football?

A) 7.6 m/s, 16 m/s D) 13 m/s, 8.4 m/s

B) 16 m/s, 7.6 m/s E) 9 m/s, 9 m/s

C) 8.4 m/s, 13 m/s

14. How far does the football travel *horizontally* before it hits the ground?

A) 18 m B) 25 m C) 36 m D) 48 m E) 72 m

15. Trying to throw a ball over an 8 m high wall located 12 meters away, you throw the ball with a velocity of 15 m/s at an angle of 20 degrees.

a. How long does it take for the ball to reach the wall?

b. What is the height of the ball when it reaches the wall?

16. A ball is thrown with an initial velocity of 250 m/s at an angle of 65 degrees.

a. What is the maximum height of the ball?

b. When will the ball return to its original height?

c. How far does the ball travel before it reaches its original height?

d. If the ball is fired from the top of a 50m tall cliff (with the same speed and at the same angle), what will its displacement in the x-direction be when it hits the ground?

17. A cannon is fired from the top of a 75m tall tower. If it lands 150m away, what is the initial velocity of the cannon ball?