2D Kinematics: Pre-Test Practice

1. Find the x-component of the following vector: 44m/s [68o below +x]

a. 14m/s b. -14m/s c. 16m/s d. -16m/s

e. 21m/s f. -21m/s g. 29m/s h. -29m/s

i. 41m/s j. -41m/s k. 44m/s l. -44m/s

2. Find the y-component of the following vector: 44m/s [68o below +x]

a. 14m/s b. -14m/s c. 16m/s d. -16m/s

e. 21m/s f. -21m/s g. 29m/s h. -29m/s

i. 41m/s j. -41m/s k. 44m/s l. -44m/s

3. Find the x-component of the following vector: 68m/s [19o N of W]

a. 34m/s b. -34m/s c. 49m/s d. -49m/s

e. 64m/s f. -64m/s g. 22m/s h. -22m/s

i. 53m/s j. -53m/s k. 11m/s l. -11m/s

4. Find the y-component of the following vector: 68m/s [19o N of W]

a. 34m/s b. -34m/s c. 49m/s d. -49m/s

e. 64m/s f. -64m/s g. 22m/s h. -22m/s

i. 53m/s j. -53m/s k. 11m/s l. -11m/s

B A

4.0km

3.0km

C

5. A car travels from A to B to C along the path shown above. The trip takes 7.0 minutes. What is the average speed for the trip?

a. 17m/s b. 12m/s c. 12m/s [37o below -x]

d. 12m/s [53o below –x] e. 12m/s [37o above +x] f. 12m/s [53o above +x]

6. A car travels from A to B to C along the path shown above. The trip takes 7.0 minutes. What is the average velocity for the trip?

a. 17m/s b. 12m/s c. 12m/s [37o below -x]

d. 12m/s [53o below –x] e. 12m/s [37o above +x] f. 12m/s [53o above +x]

7. A bird is flying 4.0m/s west and then turns to travel 3.0m/s south. Assuming constant acceleration, what is the bird’s average velocity?

a. 5.0m/s [37o S of W] b. 2.5m/s [37o S of W] c. 5.0m/s [37o S of E]

d. 2.5m/s [37o S of E] e. 5.0m/s [37o N of W] f. 2.5m/s [37o N of W]

8. A bird is flying 4.0m/s west and then turns to travel 3.0m/s south. What is the bird’s change in velocity?

a. 5.0m/s [37o S of W] b. 2.5m/s [37o S of W] c. 5.0m/s [37o S of E]

d. 2.5m/s [37o S of E] e. 5.0m/s [37o N of W] f. 2.5m/s [37o N of W]

9. A projectile is fired at 60.0m/s [30.0o above horizontal]. Which of the following is the best estimate for the time the projectile will take to reach its highest point?

a. 0.5s b. 1s c. 2s d. 3s e. 4s f. 6s

10. A car accelerates from rest over 100m in 5.0s. What is the average speed?

a. 10m/s b. 20m/s c. 40m/s d. 50m/s e. 25m/s f. 18m/s

11. A car accelerates from rest over 100m in 5.0s. What is the final speed?

a. 10m/s b. 20m/s c. 40m/s d. 50m/s e. 25m/s f. 18m/s

12. If two velocity vectors with magnitudes 5.00 m/s and 7.00 m/s are added, which of the following magnitudes is **IMPOSSIBLE** for the resultant?

a. 12.5 m/s b. 12.0 m/s c. 7.00 m/s d. 5.00 m/s e. 3.0 m/s

13. Which of the following is a possible graph of **horizontal velocity vs. time** for a projectile thrown upward from the ground?

a. b. c. d.

14. Which of the following is a possible graph of **vertical velocity vs. time** for a projectile thrown upward from the ground?

a. b. c. d.

15. Which of the following is a possible graph of **vertical acceleration vs. time** for a projectile thrown upward from the ground?

a. b. c. d.

16. Which of the following is a possible graph of **vertical position vs. time** for a projectile thrown upward from the ground?

a. b. c. d.

17. The slope of a velocity vs. time graph tells which of the following?

a. average velocity b. change in velocity c. displacement d. acceleration

18. A Styrofoam cup filled with soy sauce and powdered sugar free falls *from rest*. It takes the cup a time T to fall a distance D. How long would it take a second cup to fall a distance 2D?

a. 2T

b. ½ T

c. 4T

d. need to know the masses of the objects to answer

e. T

19. A projectile is launched over level ground at an angle of 30.0o. The projectile takes 2.00s to reach its maximum height. What was its initial speed?

a. 9.80m/s

b. 19.6m/s

c. 27.6m/s

d. 39.2m/s

e. 42.1m/s

20. A projectile is fired at 23.5m/s at an angle of 10.0o above horizontal. The projectile strikes a wall that is 7.50m away horizontally. How high up the wall does it hit?

a. 65cm b. 81cm c. 1.2m d. 1.3m e. 1.8m

21. A car travels clockwise ¼ of the way around a circular track at constant speed. The car begins at the 6 o’clock position.

What is the direction of the change in velocity?

a. b.

c. d.

e.

Consider the following **v** vs. t graph and answer questions 22-26

**v**

t

t1 t2 t3 t4 t5

22. At what time(s) will there be a vertex on the corresponding **d** vs t graph?

a. t1 only

b. t2 only

c. t3 only

d. t2 and t3

e. t1 and t4

23. When is the acceleration zero?

a. from 0 to t2

b. At t1 and t4 only

c. from t1 to t4

d. from t2 to t3

e. from t3 to t5

24. When is the velocity negative?

a. from 0 to t1

b. from 0 to t1 and t4to t5

c. from t1 to t4

d. from t2 to t3

e. from t3 to t5

25. When is the object speeding up?

a. from 0 to t1 and t3 to t4

b. from 0 to t2

c. from t1 to t4

d. from t1 to t2 and t4 to t5

e. from t1 to t2 only

26. What doe the shaded region between t=0 and t=t1 represent?

a. average velocity from 0 to t1.

b. change in velocity from 0 to t1.

c. displacement from 0 to t1.

d. acceleration from 0 to t1.

e. none of the above

27. Which vector equation below correctly matches the vector diagram shown?

**D**

**K**

**R**

a. **D+K=R**

b. **D+R=K**

c. **K+R=D**

d. **D+K+R=0**

28. A buffalo runs off of a 9.0m high cliff at 8.00m/s. How far from the base of the cliff does it land?

a. 4.0m

b. 6.0m

c. 9.0m

d. 11.0m

e. 17m

f. 26m

29. Car A and Car B are 500.0m apart, facing one another. Car A has an initial velocity of 3.00m/s right. Car B has a constant velocity of 8.00m/s left. At t=0.000s Car A begins to accelerate at 2.00m/s2 right. Assuming that Car A starts at the origin, at what position do the cars meet?

30. A canon-ball is launched, on level ground, with a speed of 99.0 m/s. The launch angle is 64.5o above positive x.

a. Find the horizontal distance travelled before landing.

b. The maximum height reached by the canon-ball.

31. An object travels horizontally off of a 36m high cliff. The object lands 41m from the base of the cliff.

a. Find the initial velocity.

b. Find the velocity at impact.

32. A 2.6kg frozen chicken is launched with a velocity of 32m/s @ 71o above horizontal from the top of a 12m high building.

a. Find the velocity of the chicken as it lands.

b. Find the range of the flight.

33. A car drives horizontally at 72.0km/h from a 9.0m tall cliff. How far from the base of the cliff does the car land?

34. A potato is thrown, on level ground, with a speed of 29.0 m/s. The throw angle is 38.2o above positive x.

a. Find the horizontal distance travelled before landing.

b. The maximum height reached by the potato.

35. A helicopter was moving upwards at a constant rate of 5.0m/s. When the helicopter was 250m above the ground, the pilot threw her apple core horizontally (relative to the helicopter) out the window with a speed of 7.0m/s. How long is the apple in the air? What is the range of its flight?

36. A bomber is flying level at a speed Vi=72m/s, at an elevation of h=103m. When directly over the origin the bomb is released and strikes the truck, which is moving along a level road (the X axis) with constant speed. At the instant the bomb is released the truck is at a position o= 125m from O, Find the value of and the time of flight of the bomb. (Assume that the truck is 3.00m high.)

TN00686_

Bomber

Bomb

MC900337854[1]

h=103m

MC900337854[1] 125m v2

3m

O