

Total Time: 56 minutes

Total Mark: 58 points

1. Your friend, who is in a field 100 meters away from you, kicks a ball towards you with an initial velocity of 15 m/s. Assuming the grass causes the ball to decelerate at a constant rate of 2 m/s^2 , how long does it take for the ball to reach you?

- A. 10 s
- B. 7.5 s
- C. It never reaches you.
- D. 2.5 s

(1 point)

2. You drop a ball from the top of a 50 m tall building. How long does it take to hit the ground? Ignore air resistance.

- A. 3.2 s
- B. 10.2 s
- C. 9.8 s
- D. 5.1 s

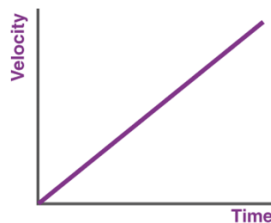
(1 point)

3. A tourist stands at the bottom of the Eiffel Tower, which has a height of 324 meters. She wants to shoot her potato gun such that the potato *just* makes it to the top. Assuming no air resistance, how fast must the potato be launched?

- A. 9.8 m/s
- B. 79.7 m/s
- C. 39.9 m/s
- D. 57.1 m/s

(1 point)

4. The velocity of an object and its time are plotted. From the graph, we can know that the object is ____, and the area under the curve represent ____.



- A. Accelerating constantly, displacement
- B. Moving at a constant speed, distance

- C. Decelerating constantly, deceleration
- D. Stationary, distance

(1 Point)

5. An object moves at 10m/s and stops after 3 seconds. The acceleration of the object is___

- a. $-10/3$ m/s
- b. $10/3s$ m/s
- c. 3.89 m/s
- d. -2.45 m/s

(1 point)

6. A car at a velocity of 27 meters per second to the right, and it takes 3 second for the car to slow down to rest.

- a. What is the acceleration of the car?

(1 point)

- b. What is the horizontal displacement travelled by the car?

(2 point)

7. A ball with an initial velocity of 11.9 m/s is shoot horizontally from a mountain of height of 100m. Assuming no air resistance how fast must ball travelled horizontally?

(3 pints)

8. An object moves at an initial velocity of 6m/s, but due to friction, the object decelerates at 0.01m/s. How far does the object travel after 10 seconds?

(3 points)

9. During the Easter holiday, a kid rolls eastern egg at 6m/s and the eggs moves at this velocity from 10 seconds. The kid's mother wants to hand him a bottle of water, but the bottle drops and collides with the egg. After the collision, the egg moves oppositely at 3m/s. After 2 second, the egg stops.

- a. Calculate the total displacement the egg travels

(2 points)

- b. Calculate the total distant the egg travels

(2 points)

- c. Graph the velocity of the egg with respect to time (Velocity VS Time graph)

(2 points)

- d. Graph the speed of the egg with respect to time (Speed VS Time graph)

(2 points)

10. A student is working a physics investigation about motion in 1D. He borrows a projectile launcher from his teacher and launches a steal ball vertically upward with an initial velocity of 12.3m/s . The student wants to know at what time the ball will reach its maximum height. He uses a timer and starts timing when the steel ball is launched. However, the student accidentally starts the time a little earlier, and when he realizes this, the timer shows 3.7 seconds, and the machine launches the steel ball.

- a. How long does it take for the steel ball to reach its maximum?

(2 points)

- b. At what should the steel ball reach its maximum height?

(2 points)

- c. What is the value of the object's maximum height?

(3 points)

11. A hot air balloon is initially sitting on the roof of a building which is 120 meters tall. At $t=0$ sec the balloon is released and initially accelerates upward at 1.2 m/sec^2 until after 5.0 seconds the balloon finally achieves its maximum upward speed. Exactly 4.0 seconds after the balloon achieves its maximum speed a brick accidentally is dropped from the balloon.

a. What was the maximum velocity of the balloon?

(3 points)

b. What was the height of the balloon when it reached the maximum velocity?

(3 points)

c. What was the height of the balloon when the brick was dropped?

(3 points)

d. What was the velocity of the brick as it was dropped from the balloon?

(3 points)

e. What was the maximum height reached by the brick?

(3 points)

f. How long after it was dropped did the brick strike the ground?

(3 points)

12. A ball is thrown vertically upward with a velocity of 10 m/s from a hill that is 13 meters tall.

a. What is the theoretical maximum height the ball can reach?

(3 points)

b. Why is the actual maximum height might be less than the theoretical maximum height?

Science Knowledge -Motion in 1D Practice Test

(2 points)

c. What is the final velocity of the ball?

(3 points)

d. How long does it take for the ball to reach the ground level?

(3 points)