Name: 04/09/16

Quiz 1: Kinematics

1. A car starts from rest and accelerates uniformly at at rate of 4.9 m/s2. What is its speed after it has traveled 200 meters?
   (a) 1960 m/s
   (b) 62.6 m/s
   (c) 44.3 m/s
   (d) 31.3 m/s

2. Two spheres, A and B, are simultaneously projected horizontally from the top of a tower. Sphere A has a horizontal speed of 40. meters per second and sphere B has a horizontal speed of 20. meters per second. Which statement best describes the time required for the spheres to reach the ground and the horizontal distance they travel? [Neglect friction and assume the ground is level.]
   (a) Both spheres hit the ground at the same time and at the same distance from the base of the tower.
   (b) Both spheres hit the ground at the same time, but sphere A lands twice as far as sphere B from the base of the tower.
   (c) Both spheres hit the ground at the same time, but sphere B lands twice as far as sphere A from the base of the tower.
   (d) Sphere A hits the ground before sphere B, and sphere A lands twice as far as sphere B from the base of the tower.

3. A man stands on the top of a bridge, where he drops a rock. Half a second later, he drops another rock. As the rocks fall, the distance between them will -
   (a) increase
   (b) decrease
   (c) stay the same
   (d) it is impossible to tell without knowing the masses of the rocks.

4. A golf ball is given an initial speed of 20. meters per second and returns to level ground. Which launch angle above level ground results in the ball traveling the greatest horizontal distance?
   (a) 60.°
   (b) 30.°
   (c) 45°
   (d) 15°

5. A spacecraft is drifting through space at a constant velocity. Suddenly, a gas leak in the side of the spacecraft gives it a constant acceleration in a direction perpendicular to the original velocity. The orientation of the spacecraft does not change, so the acceleration remains perpendicular to the original direction of the velocity. What is the shape of the path the spacecraft moves along?
   (a) Linear
   (b) Circular
   (c) Parabolic
   (d) Hyperbolic

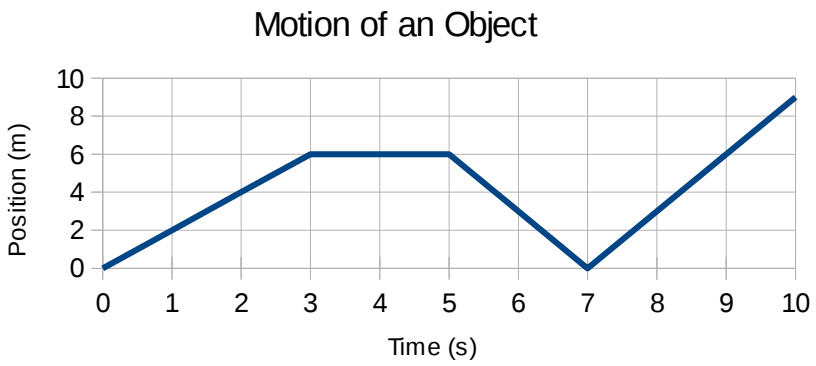
6. Which of the following objects would have an acceleration of 0 m/s.
   (a) A car that begins to move as a traffic light turns green.
   (b) An airplane flying at a constant speed along a circular path.
   (c) A train coasting down a hill.
   (d) A boat traveling at a constant speed along a straight path.

7. A softball is thrown from outfield to the catcher. Which of the following statements is true when the ball reaches its highest point?
   (a) Both its velocity and acceleration are 0 m/s.
   (b) Its velocity is non-zero but its acceleration is zero.
   (c) Its velocity is perpendicular to its acceleration
   (d) Both its velocity and acceleration could be zero, depending on the angle the ball is thrown.

8. A book is moved once around the perimeter of a table, with dimensions 1m x 2 m. It ends up in the same position it started from. What are the distance traveled and displacement of the book?
   (a) $d = 3\,m, \vec{d} = 3\,m$
   (b) $d = 6\,m, \vec{d} = 0\,m$
   (c) $d = 0\,m, \vec{d} = 6\,m$
   (d) $d = 6\,m, \vec{d} = 6\,m$

9. On another planet, a marble is released from rest and allowed to fall. It falls 4 m in the first second. What distance does it fall in the next second?
   (a) 4 m
   (b) 8 m
   (c) 12 m
   (d) 16 m

In question 10, two answers are correct. Select BOTH. No credit will be given for incorrect or partially correct answers.



10. Which of the following best describe the motion of the object in the graph?
    (a) The object is stopped from t=3s to t=5s.
    (b) The object moves to the right from t=0s to t=3 seconds.
    (c) At t=6s, the speed of the object is -3 m/s.
    (d) The magnitude of the velocity at t=6s is equal to the magnitude of the velocity at t=9s.