

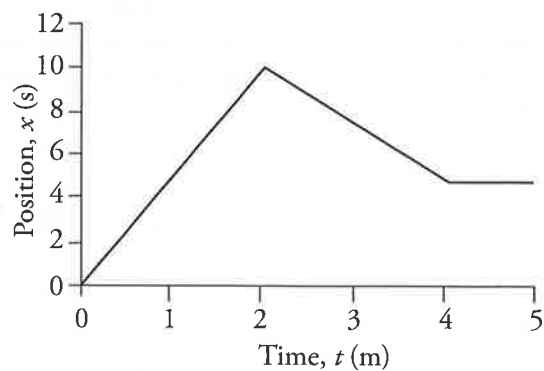
CHAPTER 2 FREESTANDING PRACTICE QUESTIONS

1. In a crash simulation, a car traveling at x m/s can stop at a distance d m with a maximum deceleration. If the car is traveling at $2x$ m/s, which of the following statements is/are true, assuming a maximum deceleration?
- The stopping time is doubled.
 - The stopping distance is doubled.
 - The stopping distance is quadrupled.
- A) I and II only
B) I and III only
C) II only
D) III only
2. A ball is thrown in a projectile motion trajectory with an initial velocity v at an angle θ above the ground. If the acceleration due to gravity is $-g$, which of the following is the correct expression of the time it takes for the ball to reach its highest point, y , from the ground?
- A) $v^2 \sin \theta / g$
B) $-v \cos \theta / g$
C) $v \sin \theta / g$
D) $v^2 \cos \theta / g$
3. A surfer searching for the perfect wave paddles out to sea on her surfboard. She heads West from her beach spot and paddles at a rate of 8 meters per minute. There is a constant current in the water that day, pulling the surfer South at 6 meters per minute. After 5 minutes of paddling, how far is the surfer from her original beach spot?
- A) 40 m West
B) 40 m Southwest
C) 50 m Southwest
D) 70 m Southwest
4. A bubble in a glass of beer releases from rest at the bottom of the glass and rises at acceleration, a , to the surface in t seconds. How much farther does the bubble travel in its last second than in its first second?
- A) at
B) $(t-1)a$
C) $(t+1)a$
D) $(\frac{1}{2})at$
5. On Earth, a tennis player can hit a tennis ball normally, causing the ball to travel on a path that is a symmetrical parabola. A tennis player can also hit a tennis ball with a “slice” which causes the ball to spin and deviate to one side of its normal path. What is the best explanation for this deviation?
- A) There is an additional acceleration on the ball.
B) The spin on the ball caused the acceleration from gravity to change direction.
C) The spin on the ball used energy so the ball could not travel in a straight line.
D) The gravitational field was not uniform.
6. An object is launched from the top of a 45° incline. The object reaches the peak of the incline and then falls to the ground. How far does the object travel horizontally from the base of the incline to the point where it hits the ground?
- A) 0.5
B) 1
C) 2
D) 4

6. An object is thrown with an initial speed of 7 m/s directed 45° above the horizontal from a cliff. After reaching the peak of its trajectory, it falls 20 m to the ground below. What is the approximate ratio of the time it takes to hit the ground from the peak of the trajectory to the time it takes from its release to the peak of the trajectory?

- A) 0.5
 B) 1
 C) 2
 D) 4

7. The position x of an object is plotted as a function of time t . What is the acceleration of the object from $t = 2 \text{ s}$ to $t = 4 \text{ s}$?



- A) -2.5 m/s^2
 B) 0 m/s^2
 C) 2.5 m/s^2
 D) 5 m/s^2