

One Dimensional Kinematics

Concept Questions

Question 1 You are throwing a ball straight up in the air. At the highest point, the ball's

1. velocity and acceleration are zero
2. velocity is nonzero but its acceleration is zero
3. acceleration is nonzero, but its velocity is zero
4. velocity and acceleration are both nonzero.

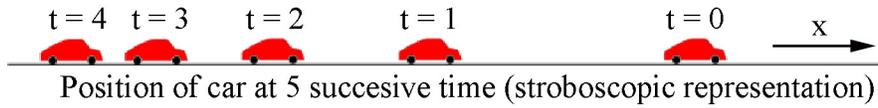
Question 2 An object goes from one point in space to another. After it arrives at its destination, the distance it traveled is:

1. either greater than or equal to
2. always greater than
3. always equal to
4. either smaller than or equal to
5. always smaller than
6. either smaller or larger than

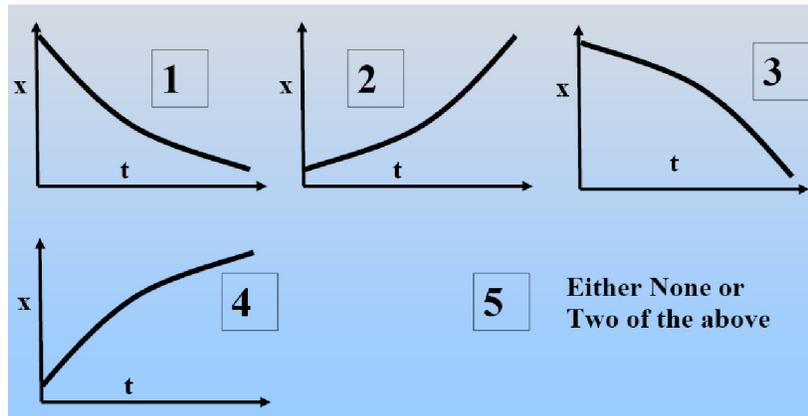
the magnitude of the displacement.

Question 3 Strobe Representation 1

The strobe picture shows the position of the object at $t = 0$, $t = 1\text{s}$, $t = 2\text{s}$, $t = 3\text{s}$, and $t = 4\text{s}$.

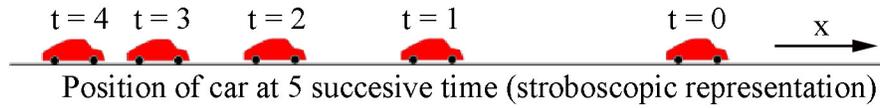


Which of the graphs below is a possible graph of the position, $x(t)$?

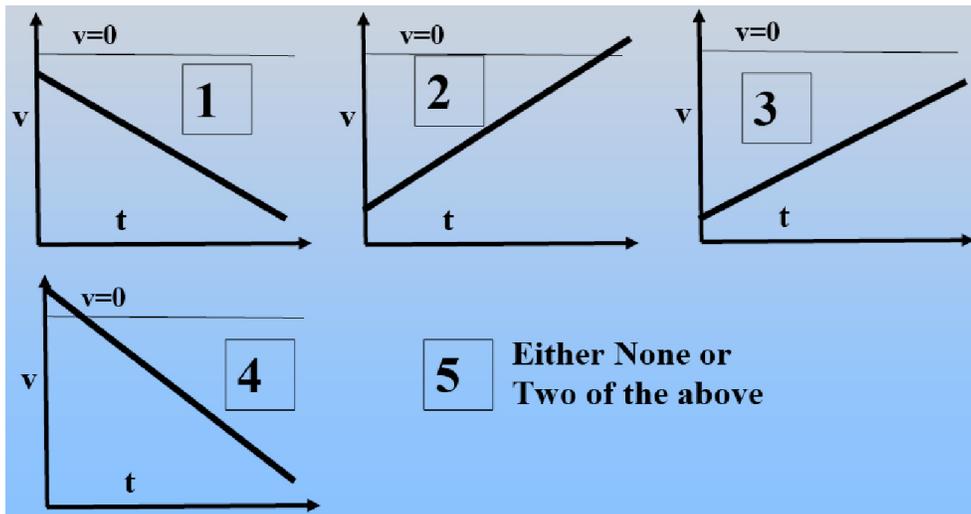


Question 4 Strobe Representation 2

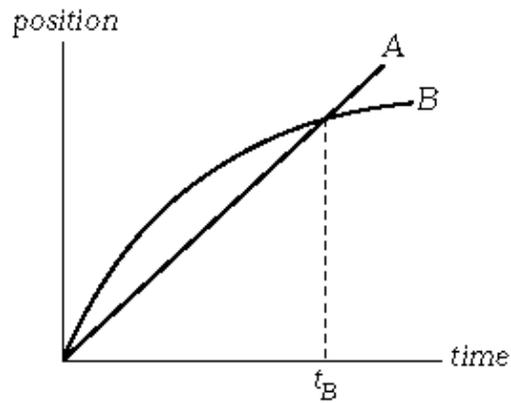
The strobe picture shows the position of the object at $t = 0$, $t = 1\text{s}$, $t = 2\text{s}$, $t = 3\text{s}$, and $t = 4\text{s}$.



Which of the graphs below is a possible graph of the x-component of velocity?



Question 5 The graph shows position as a function of time for two trains running on parallel tracks. For times greater than $t = 0$, which is true:

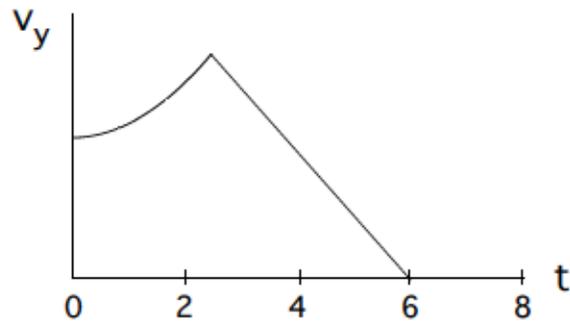


1. At time t_B , both trains have the same velocity.
2. Both trains speed up all the time.
3. Both trains have the same velocity at some time earlier than t_B .
4. Somewhere on the graph, both trains have the same acceleration.

Question 6 A person standing at the edge of a cliff throws one ball straight up and another ball straight down, each at the same initial speed. Neglecting air resistance, which ball hits the ground below the cliff with the greater speed:

1. ball initially thrown upward;
2. ball initially thrown downward;
3. neither; they both hit at the same speed.

Question 7



The graph above represents the y -component of the velocity of an object as a function of time. Which of the following could be a reasonable description of its motion?

1. The object accelerates upward at a constant rate and then accelerates downward until it hits the ground at $t = 6$ s.
2. The object accelerates upward at a constant rate and then accelerates downward until it reaches its highest point at $t = 6$ s.
3. The object accelerates upward at a non-constant rate and then accelerates downward until it hits the ground at $t = 6$ s.
4. The object accelerates upward at a non-constant rate and then accelerates downward until it reaches its highest point at $t = 6$ s.
5. None of the above.