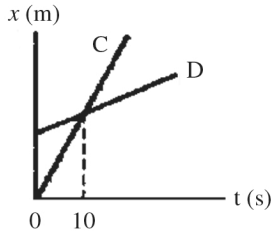
AP Physics 1 **Practice Test** **1-D Motion**

Name : _____ Period : _____ Teacher :_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) When a ball is thrown straight up with no air resistance, the acceleration at its highest point 1) _____
A) is upward
B) is zero
C) is downward
D) reverses from upward to downward
E) reverses from downward to upward

2) The figure shows a graph of the position x of two cars, C and D, as a function of time t. 2) _____

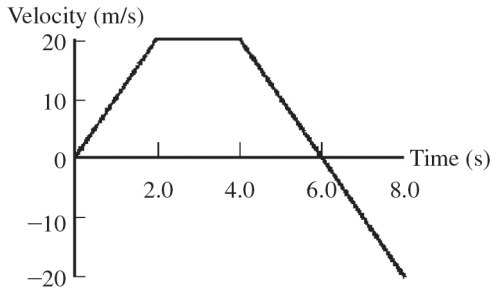


According to this graph, which statements about these cars must be true? (There could be more than one correct choice.)
A) The magnitude of the acceleration of car C is greater than the magnitude of the acceleration of car D.
B) At time $t = 10$ s, both cars have the same velocity.
C) The cars meet at time $t = 10$ s.
D) Both cars have the same acceleration.
E) The magnitude of the acceleration of car C is less than the magnitude of the acceleration of car D.

3) Suppose that an object is moving with a constant velocity. Which statement concerning its acceleration must be correct? 3) _____
A) The acceleration is a constant non–zero value.
B) The acceleration is constantly increasing.
C) The acceleration is equal to zero.
D) The acceleration is constantly decreasing.

4) A ball is thrown straight up, reaches a maximum height, then falls to its initial height. Which of the following statements about the direction of the velocity and acceleration of the ball as it is *going up* is correct? 4) _____
A) Both its velocity and its acceleration point upward.
B) Both its velocity and its acceleration points downward.
C) Its velocity points upward and its acceleration points downward.
D) Its velocity points downward and its acceleration points upward.

5) The figure shows a graph of the velocity of an object as a function of time. What is the displacement of the object from 0 s to 8.0 s? 5) _____

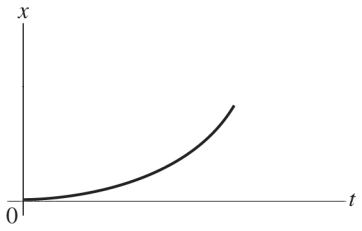


A) 80 m B) 60 m C) 20 m D) 100 m E) 40 m

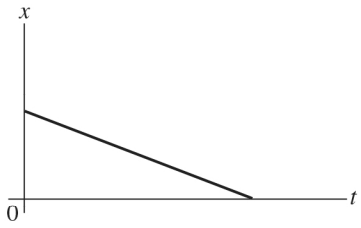
6) Which of the following graphs represent an object at rest? 6) _____

(a)

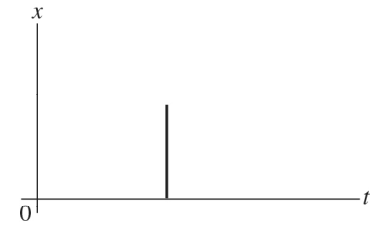
(b)



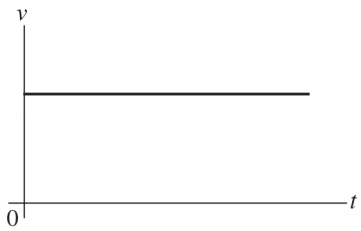
(c)



(d)



(e)

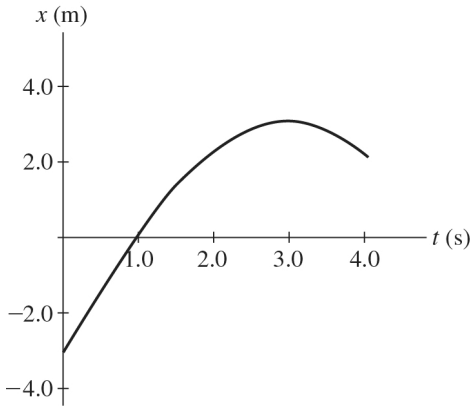


A) graph a B) graph b C) graph c D) graph d E) graph e

7) A 10–kg rock and a 20–kg rock are thrown upward with the same initial speed v_0 and experience no significant air resistance. If the 10–kg rock reaches a maximum height h, what maximum height will the 20–kg ball reach? 7) _____

A) $h/2$ B) h C) $2h$ D) $4h$ E) $h/4$

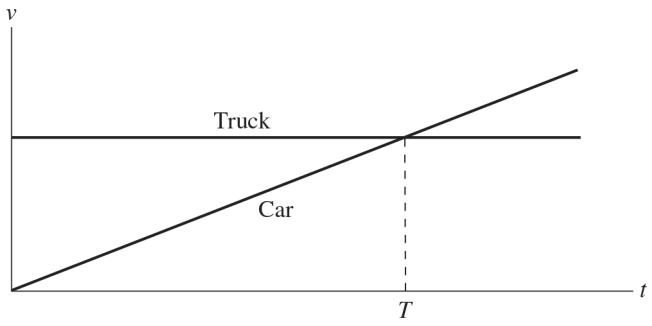
8) The graph in the figure shows the position of a particle as it travels along the x–axis. 8) _____



At what value of t is the speed of the particle equal to 0 m/s?

A) 3 s B) 2 s C) 1 s D) 0 s E) 4 s

9) The motions of a car and a truck along a straight road are represented by the velocity–time graphs in the figure. The two vehicles are initially alongside each other at time $t = 0$. 9) _____



At time T, what is true of the *distances* traveled by the vehicles since time $t = 0$?

A) The truck will have travelled further than the car.
B) The truck will not have moved.
C) They will have traveled the same distance.
D) The car will have travelled further than the truck.

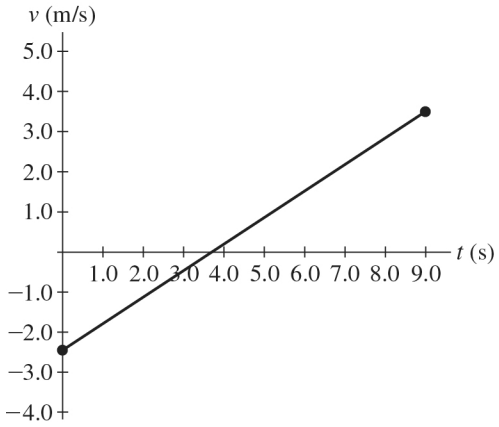
10) Ball A is dropped from the top of a building. One second later, ball B is dropped from the same building. Neglect air resistance. As time progresses, the difference in their speeds 10) _____

A) increases.
B) decreases.
C) remains constant.
D) cannot be determined from the information given.

11) A cart starts from rest and accelerates uniformly at 4.0 m/s^2 for 5.0 s. It next maintains the velocity it has reached for 10 s. Then it slows down at a steady rate of 2.0 m/s^2 for 4.0 s. What is the final speed of the car? 11) _____

A) 16 m/s B) 10 m/s C) 20 m/s D) 12 m/s

12) The motion of a particle is described in the velocity vs. time graph shown in the figure. 12) _____

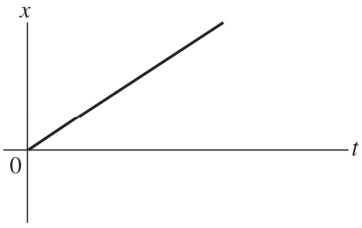


Over the nine-second interval shown, we can say that the *speed* of the particle

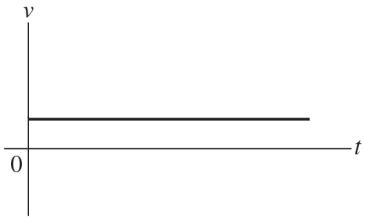
A) only decreases.
B) decreases and then increases.
C) remains constant.
D) only increases.
E) increases and then decreases.

13) Which of the following graphs represent an object having zero acceleration? 13) _____

(a)



(b)



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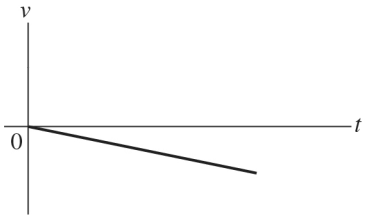
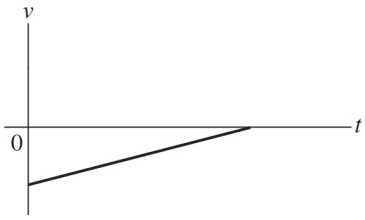


(d)



A) only graph a
B) only graph b
C) graphs c and d
D) graphs b and c
E) graphs a and b

14) A cart with an initial velocity of 5.0 m/s to the right experiences a constant acceleration of 2.0 m/s^2 to the right. What is the cart's displacement during the first 6.0 s of this motion? 14) _____

A) 66 m B) 10 m C) 55 m D) 80 m

15) A car increases its forward velocity uniformly from 40 m/s to 80 m/s while traveling a distance of 200 m. What is its acceleration during this time? 15) _____

A) 8.0 m/s^2 B) 9.6 m/s^2 C) 24 m/s^2 D) 12 m/s^2

16) An airplane starts from rest and accelerates at a constant 10.8 m/s^2. What is its speed at the end of a 400 m–long runway? 16) _____

A) 93.0 m/s B) 186 m/s C) 65.7 m/s D) 4320 m/s E) 37.0 m/s

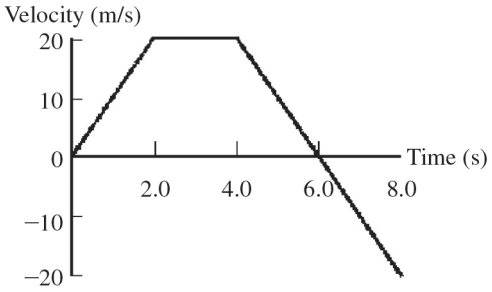
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

17) At the instant a traffic light turns green, a car that has been waiting at the intersection starts ahead with a constant acceleration of 2.00 m/s^2. At that moment a truck traveling with a constant velocity of 15.0 m/s overtakes and passes the car. 17) _____

(a) Calculate the time necessary for the car to reach the truck.
(b) Calculate the distance beyond the traffic light that the car will pass the truck.
(c) Determine the speed of the car when it passes the truck.

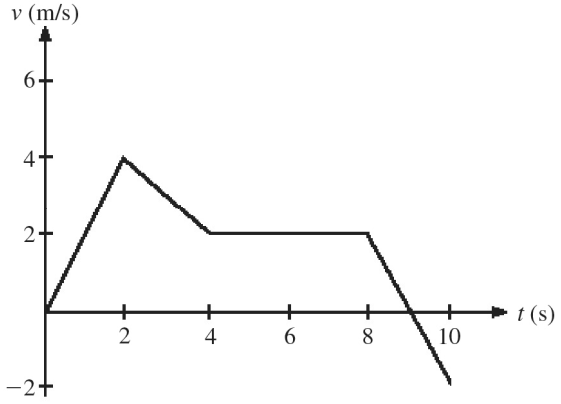
18) The figure shows a graph of the velocity of an object as a function of time. What is the acceleration of the object at the following times? 18) _____

(a) At 1.0 s
(b) At 3.0 s



19) The figure shows the velocity–versus–time graph for a basketball player traveling up and down the court in a straight-line path. Find the displacement of the player 19) _____

(a) during the first two seconds.
(b) between $t = 4$ s and $t = 8$ s.



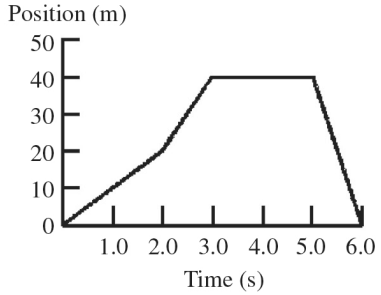
20) The figure shows a graph of the position of a moving object as a function of time. What is the velocity of the object at each of the following times? 20) _____

(a) At $t = 1.0$ s

(b) At $t = 2.5$ s

(c) At $t = 4.0$ s

(d) At $t = 5.5$ s



Answer Key
Testname: 1-D MOTION QUIZ

1) C
2) C, D
3) C
4) C
5) B
6) A
7) B
8) A
9) A
10) C
11) D
12) B
13) E
14) A
15) D
16) A
17) (a) 15.0 s (b) 225 m (c) 30.0 m/s
18) (a) 10 m/s^2 (b) 0 m/s^2
19) (a) 4 m (b) 8 m
20) (a) 10 m/s (b) 20 m/s (c) 0 m/s (d) –40 m/s