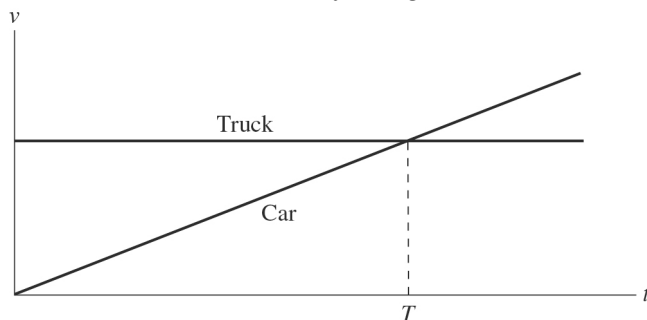


- 1) Which of the following quantities has units of a displacement? (There could be more than one correct choice.)
- A) 9.8 m/s^2
 - B) 186,000 mi
 - C) 32 ft/s^2 vertically downward
 - D) -120 m/s
 - E) 40 km southwest
- 2) When is the average velocity of an object equal to the instantaneous velocity?
- A) when the velocity is constant
 - B) only when the velocity is increasing at a constant rate
 - C) never
 - D) only when the velocity is decreasing at a constant rate
 - E) always
- 3) You drive 6.0 km at 50 km/h and then another 6.0 km at 90 km/h. Your average speed over the 12 km drive will be
- A) greater than 70 km/h.
 - B) less than 70 km/h.
 - C) equal to 70 km/h.
 - D) exactly 38 km/h.
 - E) It cannot be determined from the information given because we must also know directions traveled.
- 4) Which of the following situations is *impossible*?
- A) An object has velocity directed east and acceleration directed east.
 - B) An object has zero velocity but non-zero acceleration.
 - C) An object has velocity directed east and acceleration directed west.
 - D) An object has constant non-zero velocity and changing acceleration.
 - E) An object has constant non-zero acceleration and changing velocity.
- 5) An object moving in the $+x$ direction experiences an acceleration of $+2.0 \text{ m/s}^2$. This means the object
- A) is increasing its velocity by 2.0 m/s every second.
 - B) travels 2.0 m in every second.
 - C) is decreasing its velocity by 2.0 m/s every second.
 - D) is traveling at 2.0 m/s .
- 6) If the velocity of an object is zero at one instant, what is true about the acceleration of that object? (There could be more than one correct choice.)
- A) The acceleration could be negative.
 - B) The acceleration could be positive.
 - C) The acceleration could be zero.
 - D) The acceleration must be zero.
- 7) Suppose a ball is thrown straight up and experiences no appreciable air resistance. What is its acceleration just before it reaches its highest point?
- A) slightly greater than g
 - B) zero
 - C) slightly less than g
 - D) exactly g
- 8) 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?
- A) $h/2$
 - B) h
 - C) $2h$
 - D) $4h$
 - E) $h/4$

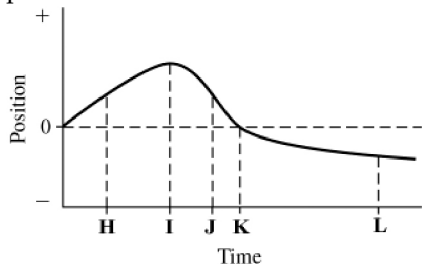
- 9) From the edge of a roof top you toss a green ball upwards with initial speed v_0 and a blue ball downwards with the same initial speed. Air resistance is negligible. When they reach the ground below
- A) the green ball will be moving faster than the blue ball.
 - B) the two balls will have the same speed.
 - C) the blue ball will be moving faster than the green ball.
- 10) An object is moving with constant non-zero velocity in the $+x$ direction. The position versus time graph of this object is
- A) a horizontal straight line.
 - B) a vertical straight line.
 - C) a straight line making an angle with the time axis.
 - D) a parabolic curve.
- 11) The slope of a position versus time graph gives
- A) acceleration.
 - B) the distance traveled.
 - C) velocity.
 - D) displacement.

- 12) 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 $t = 0$.



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

- A) They will have traveled the same distance.
 - B) The truck will not have moved.
 - C) The truck will have travelled further than the car.
 - D) The car will have travelled further than the truck.
- 13) The graph in the figure shows the position of an object as a function of time. The letters H-L represent particular moments of time.



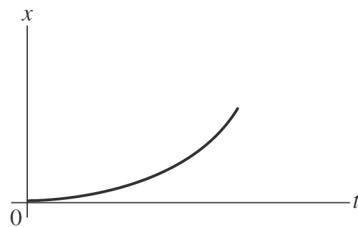
- (a) At which moment in time is the speed of the object the greatest?
- (b) At which moment in time is the speed of the object equal to zero?

14) Which of the following graphs represent an object at rest? (There could be more than one correct choice.)

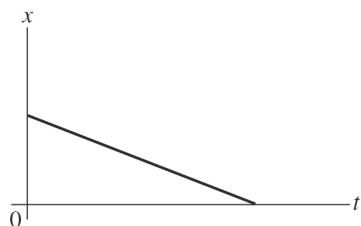
(a)



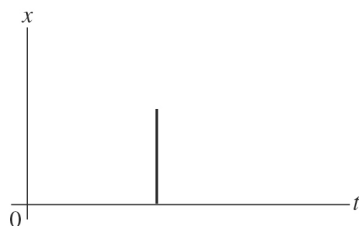
(b)



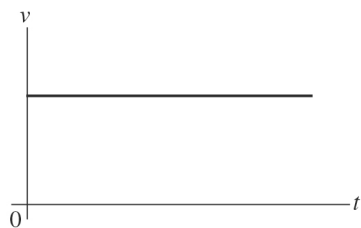
(c)



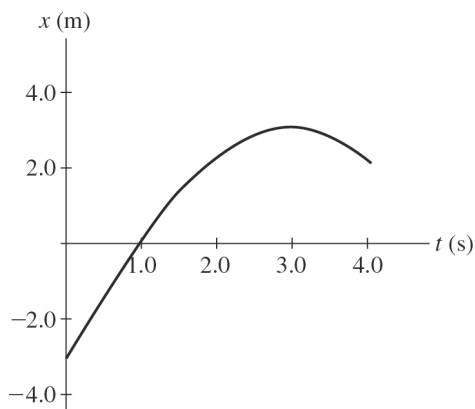
(d)



(e)



15) The graph in the figure shows the position of a particle as it travels along the x -axis.



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

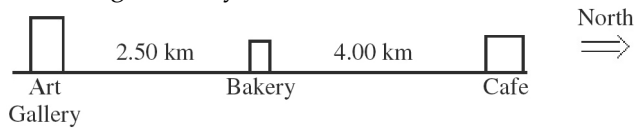
16) If, in the figure, you start from the Bakery, travel to the Cafe, and then to the Art Gallery

(a) what distance you have traveled?

(b) what is your displacement?

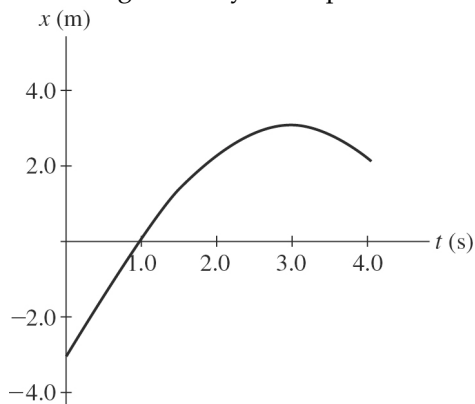


- 17) A runner ran the marathon (approximately 42.0 km) in 2 hours and 57 min. What was the average speed of the runner in m/s?
- 18) If you are driving 72 km/h along a straight road and you look to the side for 4.0 s, how far do you travel during this inattentive period?
- 19) A motorist travels 160 km at 80 km/h and 160 km at 100 km/h. What is the average speed of the motorist for this trip?
- 20) If, in the figure, you start from the Bakery, travel to the Cafe, and then to the Art Gallery in 2.00 hours, what is your
 (a) average speed?
 (b) average velocity?

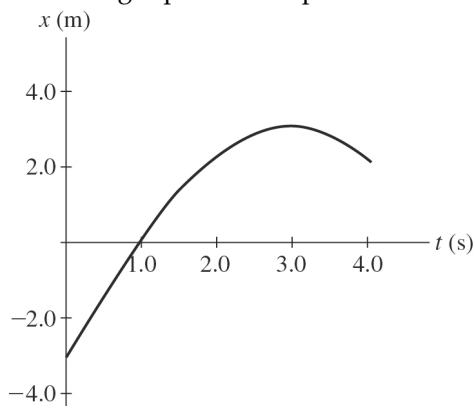


- 21) Human reaction times are worsened by alcohol. How much *further* (in feet) would a drunk driver's car travel before he hits the brakes than a sober driver's car? Assume that both are initially traveling at 50.0 mi/h and their cars have the same acceleration while slowing down, and that the sober driver takes 0.33 s to hit the brakes in a crisis, while the drunk driver takes 1.0 s to do so. (5280 ft = 1 mi)
- 22) A car initially traveling at 60 km/h accelerates at a constant rate of 2.0 m/s^2 . How much time is required for the car to reach a speed of 90 km/h?
- 23) A car starts from rest and accelerates uniformly at 3.0 m/s^2 toward the north. A second car starts from rest 6.0 s later at the same point and accelerates uniformly at 5.0 m/s^2 toward the north. How long after the second car starts does it overtake the first car?
- 24) Acceleration is sometimes expressed in multiples of g , where $g = 9.8 \text{ m/s}^2$ is the acceleration of an object due to the earth's gravity. In a car crash, the car's forward velocity may go from 29 m/s to 0 m/s in 0.15 s. How many g 's are experienced, on average, by the driver?
- 25) A car is moving with a speed of 32.0 m/s. The driver sees an accident ahead and slams on the brakes, causing the car to slow down with a uniform acceleration of magnitude 3.50 m/s^2 . How far does the car travel after the driver put on the brakes until it comes to a stop?
- 26) An instrument is thrown upward with a speed of 15 m/s on the surface of planet X where the acceleration due to gravity is 2.5 m/s^2 and there is no atmosphere. How long does it take for the instrument to return to where it was thrown?
- 27) A bullet shot straight up returns to its starting point in 10 s. What is the initial speed of the bullet, assuming negligible air resistance?
- 28) A ball is thrown downward from the top of a building with an initial speed of 25 m/s. It strikes the ground after 2.0 s. How high is the building, assuming negligible air resistance?

- 29) A ball is thrown straight upward from ground level with a speed of 18 m/s. How much time passes before the ball strikes the ground if we disregard air resistance?
- 30) Abby throws a ball straight up and times it. She sees that the ball goes by the top of a flagpole after 0.50 s and reaches the level of the top of the pole after a total elapsed time of 4.1 s. What was the speed of the ball at launch? Neglect air resistance.
- 31) The graph in the figure shows the position of a particle as it travels along the x -axis. What is the magnitude of the average velocity of the particle between $t = 1.0$ s and $t = 4.0$ s?



- 32) The graph in the figure shows the position of a particle as it travels along the x -axis. What is the magnitude of the average speed of the particle between $t = 1.0$ s and $t = 4.0$ s?



Answer Key

Testname: HW_CH2_ONE-D_KINEMATICS

- 1) B, E
- 2) A
- 3) B
- 4) D
- 5) A
- 6) A, B, C
- 7) D
- 8) B
- 9) B
- 10) C
- 11) C
- 12) C
- 13) (a) J (b) I
- 14) graph a
- 15) 3 s
- 16) (a) 10.5 km (b) 2.50 km south
- 17) 3.95 m/s
- 18) 80 m
- 19) 89 km/h
- 20) (a) 5.25 km/h (b) 1.25 km/h south
- 21) 49 ft
- 22) 4.2 s
- 23) 21 s
- 24) 20 g
- 25) 146 m
- 26) 12 s
- 27) 49 m/s
- 28) 70 m
- 29) 3.7 s
- 30) 23 m/s
- 31) 0.67 m/s
- 32) 1.3 m/s