Review sheet 2 Kinematics

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

_____ 1. What is the speed of an object at rest?
a. 0.0 m/s
b. 1.0 m/s
c. 9.8 m/s
d. 9.81 m/s

_____ 2. Which of the following is the expression for average velocity?

a. $v_{avg} = \dfrac{\Delta x}{\Delta t}$

c. $v_{avg} = \Delta x \bullet \Delta t$

b. $v_{avg} = \dfrac{\Delta t}{\Delta x}$

d. $v_{avg} = \dfrac{v_i + v_f}{2}$

_____ 3. In addition to displacement, which of the following must be used for a more complete description of the average velocity of an object?
a. m
b. kg
c. Δt
d. Δx

_____ 4. A dolphin swims 1.85 km/h. How far has the dolphin traveled after 0.60 h?
a. 1.1 km
b. 2.5 km
c. 0.63 km
d. 3.7 km

_____ 5. A hiker travels south along a straight path for 1.5 h with an average velocity of 0.75 km/h, then travels south for 2.5 h with an average velocity of 0.90 km/h. What is the hiker's displacement for the total trip?
a. 1.1 km to the south
b. 2.2 km to the south
c. 3.4 km to the south
d. 6.7 km to the south

_____ 6. Acceleration is
a. displacement.
b. the rate of change of displacement.
c. velocity.
d. the rate of change of velocity.

_____ 7. Which of the following is the expression for acceleration?

a. $a = \dfrac{\Delta t}{\Delta v}$

c. $a = \Delta t \bullet \Delta v$

b. $a = \dfrac{\Delta v}{\Delta t}$

d. $a = \dfrac{v_i - v_f}{t_i - t_f}$

_____ 8. When velocity is positive and acceleration is negative, what happens to the object's motion?
a. The object slows down.
b. The object speeds up.
c. Nothing happens to the object.
d. The object remains at rest.
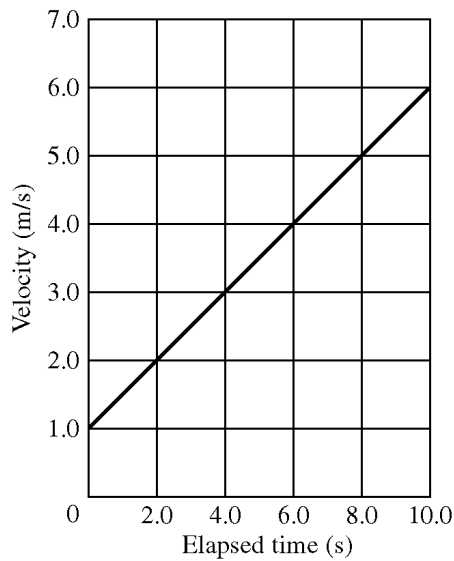
_____ 9.

What does the graph above illustrate about acceleration?
a.   The acceleration is constant.
b.   The acceleration is zero.
c.   The acceleration decreases.
d.   There is not enough information to answer.
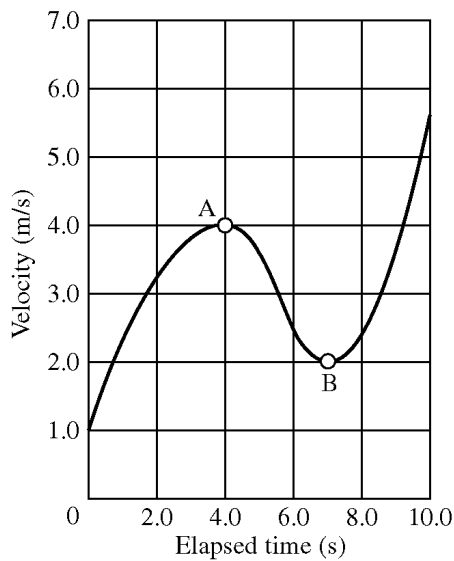
_____ 10.

What does the graph above illustrate about acceleration?
a.   The acceleration varies.
b.   The acceleration is zero.
c.   The acceleration is constant.
d.   The acceleration increases then becomes constant.

_____ 11.   A toy car is given an initial velocity of 5.0 m/s and experiences a constant acceleration of 2.0 m/s^2. What is the final velocity after 6.0 s?
a.   10.0 m/s   c.   16 m/s
b.   12 m/s   d.   17 m/s

_____ 12. A shopping cart given an initial velocity of 2.0 m/s undergoes a constant acceleration of 3.0 m/s². What is the magnitude of the cart's displacement after the first 4.0 s of its motion?
a. 10.0 m
b. 55 m
c. 32 m
d. 80.0 m

_____ 13. A race car accelerates from 0 m/s to 30.0 m/s with a displacement of 45.0 m. What is the vehicle's acceleration?
a. 2.00 m/s²
b. 5.00 m/s²
c. 10.0 m/s²
d. 15.0 m/s²

_____ 14. A marble accelerates from rest at a constant rate and travels for a total displacement of 44 m in 20.0 s. What is the average velocity of the marble?
a. 1.1 m/s
b. 2.2 m/s
c. 4.4 m/s
d. 0.0 m/s

_____ 15. A soccer ball is kicked horizontally. What is its average speed if its displacement is 21.0 m after 4.00 s?
a. 5.25 m/s
b. 8.75 m/s
c. 14.4 m/s
d. 2.63 m/s

_____ 16. A curious kitten pushes a ball of yarn at rest with its nose, displacing the ball of yarn 17.5 cm in 2.00 s. What is the acceleration of the ball of yarn?
a. 11.0 cm/s²
b. 8.75 cm/s²
c. 14.4 cm/s²
d. 4.38 cm/s²

_____ 17. A sports car accelerates at a constant rate from rest to a speed of 27.8 m/s in 8.00 s. What is the displacement of the sports car in this time interval?
a. 55.0 m
b. 77.0 m
c. 111 m
d. 222 m

_____ 18. Which of the following units are used to measure free fall?
a. m/s
b. m/s²
c. m•s
d. m²/s²

_____ 19. Which of the following is a value for the acceleration of objects in free fall?
a. 9.81 m/s²
b. –9.81 m/s²
c. 9.80 m/s²
d. –9.80 m/s²

_____ 20. Acceleration due to gravity is also called
a. negative velocity.
b. displacement.
c. free-fall acceleration.
d. instantaneous velocity.

_____ 21. The baseball catcher throws a ball vertically upward and catches it in the same spot as it returns to the mitt. At what point in the ball's path does it experience zero velocity and nonzero acceleration at the same time?
a. midway on the way up
b. at the top of its trajectory
c. the instant it leaves the catcher's hand
d. the instant before it arrives in the catcher's mitt

_____ 22. A rock is thrown straight upward with an initial velocity of 24.5 m/s where the downward acceleration due to gravity is 9.81 m/s². What is the rock's displacement after 1.00 s?
a. 9.81 m
b. 19.6 m
c. 24.5 m
d. 29.4 m

_____ 23. A rock is thrown straight upward with an initial velocity of 19.6 m/s where the downward acceleration due to gravity is 9.81 m/s². What time interval elapses between the rock's being thrown and its return to the original launch point?
a. 4.00 s
b. 5.00 s
c. 8.00 s
d. 10.0 s

_____ 24. A baseball is released at rest from the top of the Washington Monument. It hits the ground after falling for 6.00 s. What was the height from which the ball was dropped? (Disregard air resistance. $g = 9.81$ m/s^2.)
   a. 150.0 m
   c. 115 m
   b. 177 m
   d. 210.0 m

_____ 25. A coin released at rest from the top of a tower hits the ground after falling 1.5 s. What is the speed of the coin as it hits the ground? (Disregard air resistance. $g = 9.81$ m/s^2.)
   a. 15 m/s
   c. 31 m/s
   b. 21 m/s
   d. 39 m/s

_____ 26. A rock is thrown from the top of a cliff with an initial speed of 12 m/s. If the rock hits the ground after 2.0 s, what is the height of the cliff? (Disregard air resistance. $g = 9.81$ m/s^2.)
   a. 22 m
   c. 44 m
   b. 24 m
   d. 63 m

_____ 27. A tourist accidentally drops a camera from a 40.0 m high bridge. If $g = 9.81$ m/s^2 and air resistance is disregarded, what is the speed of the camera as it hits the water?
   a. 28.0 m/s
   c. 56.0 m/s
   b. 31.0 m/s
   d. 784 m/s

_____ 28. Human reaction time is usually about 0.20 s. If your lab partner holds a ruler between your finger and thumb and releases it without warning, how far can you expect the ruler to fall before you catch it? (Disregard air resistance. $g = 9.81$ m/s^2.)
   a. at least 4.0 cm
   c. at least 16.0 cm
   b. at least 9.8 cm
   d. at least 19.6 cm

_____ 29. When there is no air resistance, objects of different masses
   a. fall with equal accelerations with similar displacements.
   b. fall with different accelerations with different displacements.
   c. fall with equal accelerations with different displacements.
   d. fall with different accelerations with similar displacements.

_____ 30. Objects that are falling toward Earth move
   a. faster and faster.
   c. at a constant velocity.
   b. slower and slower.
   d. slower then faster.

_____ 31. Which would hit the ground first if dropped from the same height in a vacuum, a feather or a metal bolt?
   a. the feather
   b. the metal bolt
   c. They would hit the ground at the same time.
   d. They would be suspended in a vacuum.

_____ 32. Which would fall with greater acceleration in a vacuum, a leaf or a stone?
   a. the leaf
   b. the stone
   c. They would accelerate at the same rate.
   d. It is difficult to determine without more information.

Review sheet 2
Answer Section

MULTIPLE CHOICE

1. A
2. A
3. C
4. A
5. C
6. D
7. B
8. A
9. A
10. A
11. D
12. C
13. C
14. B
15. A
16. B
17. C
18. B
19. B
20. C
21. B
22. B
23. A
24. B
25. A
26. C
27. A
28. D
29. A
30. A
31. C
32. C