Chapter 02 Describing Motion

Multiple Choice Questions

1. An auto, starting from rest, undergoes constant acceleration and covers a distance of 1250 meters. The final speed of the auto is 50 meters/sec. How long does it take the car to cover the 1250 meters?
A. 30 s
B. 50 s
C. 0.05 s
D. 72,000 s

2. A car traveling at constant speed
A. does not turn.
B. travels more distance in a second the longer the car travels.
C. can change direction.
D. cannot be going uphill.

3. An auto moves 10 meters in the first second of travel, 15 more meters in the next second, and 20 more meters during the third second. The acceleration of the auto is
A. 3.33 m/s^2.
B. 9.8 m/s^2.
C. 30 m/s^2.
D. 5 m/s^2.
E. zero m/s^2.

4. A quantity that is a measure of how the velocity of a body changes with time is
A. distance.
B. speed.
C. acceleration.
D. time.

5. The following quantities relate to the rate of change of position. Which pair will always have the same magnitude?
A. Average speed and average velocity.
B. Average speed and instantaneous speed.
C. Average velocity and instantaneous velocity.
D. Instantaneous speed and instantaneous velocity.

6. The acceleration of a body cannot be zero at a point where
A. the instantaneous velocity is zero.
B. the instantaneous velocity is positive but decreasing.
C. the average velocity is positive.
D. none of these.

7. A student releases a ball from rest on an inclined plane and measures that it travels a distance of 0.8 m in a time of 4.0 s. The average speed of the ball is
A. 3.2 m/s.
B. 1.0 m/s.
C. 0.2 m/s.
D. 2.0 m/s.

8. A student releases a ball from rest on an inclined plane and measures that it travels a distance of 0.5 m in a time of 2.0 s. The acceleration of the ball is
A. 0.125 m/s^2.
B. 0.25 m/s^2.
C. 0.5 m/s^2.
D. 1.0 m/s^2.

9. A car travels a distance of 100 km. For the first 30 minutes it is driven at a constant speed of 80 km/hr. The motor begins to vibrate and the driver reduces the speed to 40 km/hr for the rest of the trip. The average speed for the entire trip is
A. 60.0 km/hr.
B. 53.3 km/hr.
C. 50.0 km/hr.
D. 47.5 km/hr.
E. 40.0 km/hr.

10. Initially you are driving at 55 mi/hr. If you come to rest in 7.5 s while traveling 450 ft, what is your average speed while stopping? (There are 5280 ft in one mi.)
A. 55 mi/hr
B. 0.016 ft/s
C. 120 ft/s
D. 60 ft/s

11.

If your average speed for a 6 hr trip is 60 mi/hr, the distance traveled is

A. 10 mi.
B. 60 mi.
C. 120 mi.
D. 360 mi.

12. You travel 2640 feet in thirty seconds while in a 65 mi/hr zone. (There are 5280 ft in one mi.) Your average speed is
A. larger than the speed limit.
B. exactly the speed limit.
C. less than the speed limit.

13. In a speedometer test zone on a highway, you drive 4 miles in 5 minutes. During the test, your speedometer reading is 45 mi/hr. Your speedometer reading is
A. lower than your actual speed.
B. equal to your actual speed.
C. higher than your actual speed.

14. Your car can accelerate at 8.0 m/s^2, and there are 1609 m in one mile. So you can go from zero to 60 mi/hr in about
A. 3.35 s.
B. 2.74 s.
C. 1.34 s.
D. 0.37 s.

15. In order to go from rest to 50 m/s in 10 s, a jet must be able to accelerate at
A. 2 m/s^2.
B. 5 m/s^2.
C. 20 m/s^2.
D. 50 m/s^2.

16. If the braking distance for your car at a certain speed is 200 ft and, after reacting to a situation, you have managed to stop your car in 5.0 s, then the magnitude of the acceleration was
A. 16 ft/s^2.
B. 25 ft/s^2.
C. 32 ft/s^2.
D. 50 ft/s^2.

17. A student plots data for the velocity of a body versus the time on a graph. The area under the curve on the graph may be identified as
A. acceleration.
B. average velocity.
C. average speed.
D. distance.

18. Suppose a graph of distance traveled by a body versus time is constructed. The slope of the graph at any point may be identified with
A. instantaneous acceleration.
B. instantaneous velocity.
C. average acceleration.
D. average speed.

19. A policeman walks on his beat back and forth. His average speed is determined from
A. his velocity divided by the time.
B. time divided by how far he ends up from the starting point.
C. his total distance covered divided by the time.
D. time divided by his total distance covered.

20. A car is driven between two nearby towns at an average speed of 50 miles/hour. The magnitude of the average velocity of the car
A. will always be the same as the average speed.
B. will always be less than the average speed.
C. will be the same as or greater than the average speed.
D. will be the same as or less than the average speed.
E. will always be greater than the average speed.

21. A car starts from rest and reaches 20 m/s in 5 seconds. The average acceleration of the car is
A. zero m/s^2.
B. 1.0 m/s^2.
C. 2.0 m/s^2.
D. 4.0 m/s^2.
E. 10.0 m/s^2.

22. Which of the following is not an appropriate unit for measuring acceleration?
A. miles/hr/s
B. ft/s^2
C. m/s
D. km/min/s
E. m/min^2

23. A car rolls down an incline starting from rest. A graph of position versus time is made for this motion. One can get the
A. distance traveled from the slope of the graph.
B. instantaneous velocity from the slope of the graph.
C. acceleration from the slope of the graph.
D. velocity from the area under the graph.
E. acceleration from the area under the graph.

24. A car is traveling at the velocity of 20 m/s on a flat road when it reaches the bottom of a hill. It coasts up the hill, coming to rest in 8 seconds. The average acceleration of the car while on the hill is
A. 10 m/s^2.
B. 2.5 m/s^2.
C. 0 m/s^2.
D. -2.5 m/s^2.
E. -10 m/s^2.

25. Which of the following quantities relating to motion is not a vector?
A. Distance
B. Speed
C. Velocity
D. Acceleration
E. All of these are vectors.

26. Two velocity vectors are added: one of magnitude 2.0 m/s and one of magnitude 4.0 m/s. Not knowing the respective directions, we can say that the magnitude of the sum of the vectors will be
A. 6.0 m/s.
B. between 6.0 m/s and 2.0 m/s.
C. between 6.0 m/s and 4.0 m/s.
D. less than 2.0 m/s.
E. 2.0 m/s.

27. The velocity of a body is graphed as a function of time. The slope of the graph at any point may be identified with
A. instantaneous velocity.
B. average velocity.
C. instantaneous speed.
D. instantaneous acceleration.
E. average acceleration.

28. A quantity that is a measure of how the distance traveled changes with time is
A. speed.
B. force.
C. acceleration.
D. momentum.
E. velocity.

29. A body travels at an initial speed of 2.5 m/s. Given a constant acceleration of 0.2 m/s^2, what is the speed of the body at time 25 seconds later?
A. 3.4 m/s.
B. 3.6 m/s.
C. 5.5 m/s.
D. 6.0 m/s.
E. 7.5 m/s.

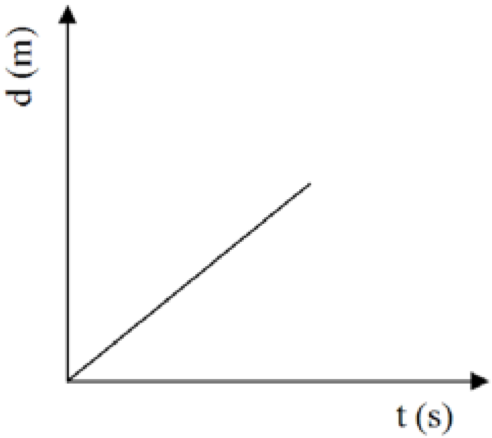
30. A car is decelerating at the rate of 2 km/s^2. If its initial speed is 66 km/s, how long will it take the car to come to a complete stop?
A. 3.3 s.
B. 132 s.
C. 33 s.
D. 330 s.

31. For the first hour a car is driven at a constant speed of 90 km/hr. The motor begins to vibrate and the driver reduces the speed to 45 km/hr for another 2 hours. The average speed for the entire trip is
A. 90.0 km/hr.
B. 25.5 km/hr.
C. 60.0 km/hr.
D. 67.5 km/hr.
E. 45.0 km/hr.

32. A car moving initially at 30 m/s comes gradually to a stop in 900 m. What was the acceleration of the car?
A. -0.5 m/s^2.
B. -5 m/s^2.
C. -10 m/s^2.
D. -20 m/s^2.

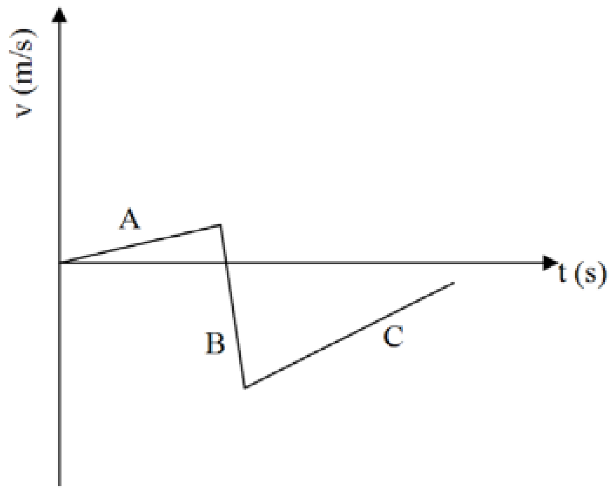
33. An object moving at 30 m/s has an acceleration of -2.0 m/s/hr. Its speed
A. increases very quickly.
B. increases very slowly.
C. decreases very slowly.
D. decreases very quickly.

34. A sprinter moving at 10 m/s slows down at a rate of 1.4 m/s^2. How fast is the runner moving after 4 seconds?
A. 0 m/s.
B. 4.4 m/s.
C. 5.8 m/s.
D. 15.6 m/s.



35. An object's distance traveled as a function of time is shown in the graph above. The graph shows
A. an object experiencing an acceleration.
B. an object with increasing speed.
C. an object turning in a circle.
D. an object

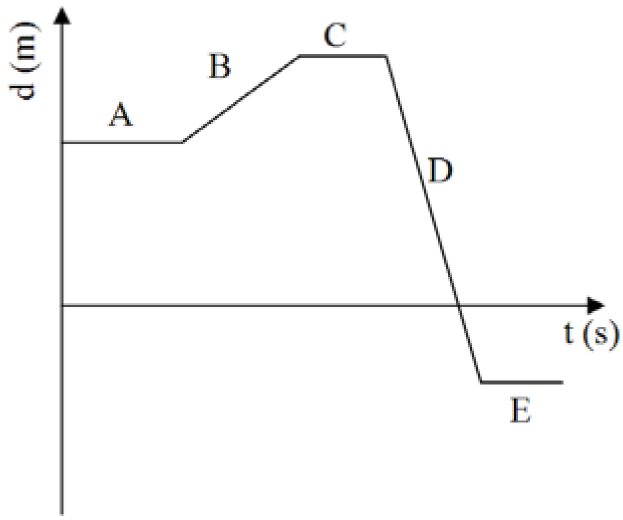
moving forward.



36. Refer to the graph above. The object moves forward
A. in region A.
B. in region B.
C. in regions A and C.
D. It always moves forward.
E. It never moves forward.

37. Refer to the graph above. The acceleration of the object is equal to zero
A. in region A.
B. in region B.
C. in region C.
D. in regions A and C.
E. The acceleration is never equal to zero.

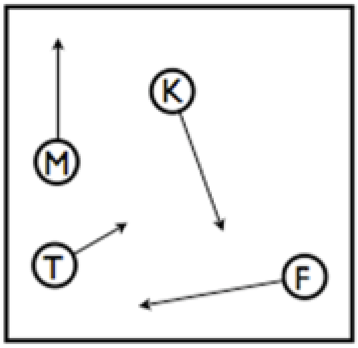
38. Refer to the graph above. The magnitude of the acceleration of the object is largest
A. in region A.
B. in region B.
C. in region C.
D. The object does not accelerate.



39. Refer to the graph above. The velocity of this object at the start of the motion is
A. positive.
B. zero (it is not moving).
C. negative.
D. It is not possible to tell from the graph.

40. Refer to the graph above. The speed of the object is largest
A. in region A.
B. in region B.
C. in region C.
D. in region D.
E. in region E.

41. Refer to the graph above. For the entire motion, the average velocity is
A. positive.
B. zero (it is not moving).
C. negative.
D. It is not possible to tell from the graph.

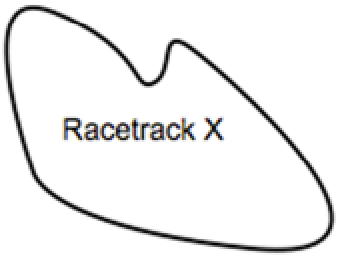


42. Refer to diagram of billiard balls F, K, M, and T. Each arrow represents the velocity of the ball. If billiard ball M is traveling straight upward at 2.5 m/sec, then
A. billiard ball M must be faster than T.
B. billiard ball F is the slowest of the four.
C. billiard ball K has the same velocity as M.
D. nothing about their speeds can be said, because they are all moving in different directions.

43. Refer to the speedometer in Figure 2.3. The speedometer reading 75 mph is
A. approximately 2 kilometers per minute.
B. exactly 1 mile per minute.
C. 200 meters per second.
D. the only speed at which mph and km/h are equal.

44. A car driver takes Turn 1 at Daytona International Speedway at a steady 120 mph all the way through the turn. The radius of this turn is 1000 feet. Which statement is true?
A. Its velocity is constant because its speed is constant.
B. Its speed is constant so its acceleration is zero.
C. Change of direction at constant speed means a change in velocity.
D. Its velocity changes only if its speed decreases.

Refer to the diagram of Racetrack X.



45. This special racetrack is all curve and no straightaway. If a driver takes her car around this track counterclockwise and at constant speed, then greater acceleration will occur at any place the turning radius is
A. larger.
B. smaller.
C. inward.
D. outward.

46. Refer to the diagram of Racetrack X. It is ________ for a racer to have uniform acceleration ________ on this track.
A. impossible; anywhere
B. impossible; at some places
C. possible; everywhere
D. guaranteed, at some places

Fill in the Blank Questions

47. Suppose a body sliding up a ramp is decelerating at a constant rate. Its speed will __________ by the same amount each second.

____

48. A car starts from rest and after 10 seconds is traveling at 30 m/s. Assuming that it continues to accelerate at the same rate it will take another ________ seconds to reach 60 m/s.

____

49. A car accelerates uniformly. It starts from rest and reaches 36 m/s after 6.0 seconds. During the 6.0 seconds it has traveled _______________ m.

____

50. The tip of the second hand of a clock moves in a circle of 20 cm circumference. In one minute the hand makes a complete revolution. Its average velocity over that time is ___________ cm/s.

____

51. A speed of 150 km/hr is equivalent to _________ mph. (There are 1.609 km in a mile.)

____

52. From a graph of speed versus time, like Figure 2.15, for a body sliding down a ramp, one can get the _______________ ____________________ from the slope of the curve.

____

53. If you are traveling 80 mph, how many hours does it take you to go 80 miles?

____

Chapter 02 Describing Motion Key

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

29. E

30. C

31. C

32. A

33. C

34. B

35. D

36. A

37. E

38. B

39. B

40. D

41. C

42. A

43. A

44. C

45. B

46. A

47. decrease *or* shrink *or* be decreasing

48. 10 *or* ten *or* 10.0

49. 108 *or* 108.0 *or* 110

50. 0

51. 93

52. instantaneous acceleration *or* acceleration

53. 1 *or* 1.0 *or* one

Chapter 02 Describing Motion Summary

Category	*# of Questions*
Difficulty: Easy	40
Difficulty: Hard	5
Difficulty: Medium	8
Gradable: automatic	50
Topic: Acceleration	11
Topic: Average and Instantaneous Speed	14
Topic: Graphing Motion	13
Topic: Uniform Acceleration	11
Topic: Velocity	5
Type: Conceptual	29
Type: Definition	6
Type: Graphical	11
Type: Numerical	23