

***An Introduction to Physical Science 14th edition
Shipman Test Bank***

SKU: 9781305079137-TEST-BANK

1. Which one of the following is *not* an area of physics?
 - A) Mechanics
 - B) Optics
 - C) Algebra
 - D) Acoustics

2. Motion necessarily involves
 - A) a change in velocity.
 - B) a change in speed.
 - C) a change in direction.
 - D) a change in position.
 - E) all of these

3. The magnitude of a displacement is _____ the magnitude of the distance traveled.
 - A) always unequal to
 - B) less than or equal to
 - C) always equal to
 - D) greater than or equal to
 - E) none of these; the two cannot be compared.

4. Displacement divided by time gives
 - A) average acceleration.
 - B) average velocity.
 - C) average speed.
 - D) average distance.

5. Average speed multiplied by time gives
 - A) average acceleration.
 - B) displacement.
 - C) instantaneous speed.
 - D) distance.

6. Distance covered per unit of time is called
 - A) speed.
 - B) acceleration.
 - C) velocity.
 - D) displacement.

7. The straight-line distance and direction between two points are, together, called
- A) velocity.
 - B) displacement.
 - C) distance.
 - D) acceleration.
8. The magnitudes of two horizontal displacements are 1 m and 9 m, respectively. Given that the vectors may be in either the plus or the minus direction, they *cannot* be added together to give a total displacement of
- A) 10 m.
 - B) -8 m.
 - C) 8 m.
 - D) 9 m.
 - E) 7 m.
9. A speedometer indicates _____ if the automobile is traveling forward.
- A) instantaneous acceleration
 - B) instantaneous speed
 - C) instantaneous velocity
 - D) average speed
 - E) average acceleration
10. If an object moves with constant velocity,
- A) its speed is constant.
 - B) its direction is constant.
 - C) its average speed is constant.
 - D) its distance traveled per unit time is constant.
 - E) all of these
11. If the instantaneous velocity of an object is constant, then so is its
- A) velocity.
 - B) distance.
 - C) acceleration.
 - D) displacement.
12. The rate at which an object's velocity changes with time is called its
- A) instantaneous velocity.
 - B) motion.
 - C) speed.
 - D) acceleration.

13. An automobile's acceleration may be changed by using the
- A) windshield wipers.
 - B) steering wheel.
 - C) radio.
 - D) horn.
14. An automobile's acceleration *cannot* be changed by using the
- A) gas pedal.
 - B) brake pedal.
 - C) steering wheel.
 - D) stick shift.
 - E) turn signal.
15. An acceleration may result from
- A) a change in speed.
 - B) a change in direction.
 - C) a change in both speed and direction.
 - D) all of these
16. For which of the following is the acceleration constant?
- A) Nonuniform speed
 - B) Free fall
 - C) Uniform circular motion
 - D) None of these
17. Velocity is similar to speed, but a _____ is also involved in velocity.
- A) acceleration
 - B) direction
 - C) position
 - D) scalar
18. Which one of the following is true for deceleration?
- A) The acceleration is in the direction opposite the motion.
 - B) The acceleration is zero.
 - C) The acceleration is necessarily negative.
 - D) The velocity remains constant.

19. The distance traveled by an automobile moving at a constant velocity is
- A) directly proportional to the time.
 - B) directly proportional to the time squared.
 - C) inversely proportional to the time squared.
 - D) inversely proportional to the time.
 - E) none of these
20. An object that is moving in a linear path with an acceleration in the direction opposite to the motion has a(n) _____ velocity.
- A) constant
 - B) increasing
 - C) decreasing
 - D) none of these
21. An object that is moving in a linear path with an acceleration at a right angle to the motion has a(n) _____ velocity.
- A) changing
 - B) increasing
 - C) decreasing
 - D) constant
22. An object that is moving in a linear path with an acceleration in the direction of motion has a(n) _____ velocity.
- A) constant
 - B) increasing
 - C) decreasing
 - D) none of these
23. As a block slides down a 40° frictionless incline, its acceleration
- A) decreases with distance.
 - B) remains constant.
 - C) is greatest at the bottom of the incline.
 - D) is greatest at the top of the incline.
24. Which of the following is a possible unit of acceleration?
- A) m/s^2
 - B) $\text{m} \times \text{s}$
 - C) m^2/s
 - D) m/s

25. If the magnitude of the velocity of an object increases, we may be sure that during the time of this increase,
- A) the object is accelerated.
 - B) the acceleration of the object increases.
 - C) the object is moving in a straight path.
 - D) the object is changing direction.
 - E) none of these
26. A freely falling object
- A) has a uniformly increasing velocity.
 - B) is unaffected by gravity.
 - C) has a uniformly increasing acceleration.
 - D) has a uniformly increasing displacement.
27. An object in free fall has
- A) a constant speed.
 - B) a constant velocity.
 - C) a velocity that changes 9.8 m/s each second.
 - D) an acceleration that depends on its mass.
28. An object with a mass of 8 kg is dropped and takes 5 s to hit the ground. Then another object with a mass of 16 kg is dropped from the same point. How long does it take to hit the ground?
- A) 5 s
 - B) 10 s
 - C) 3 s
 - D) 25 s
 - E) 125 s
29. A car is moving down a freeway in a straight line at a constant rate of 24.0 m/s for 4.0 s. Its acceleration is
- A) 9.8 m/s^2 .
 - B) 9.8 m/s.
 - C) zero.
 - D) 24.0 m/s.
 - E) 6.0 m/s^2 .

30. An object is dropped from a vertical distance of 31.7 m above the ground, and it takes 2.54 sec to fall that distance. A second identical object is launched from the same height, with a horizontal velocity of 64.0 m/s. How long does the second object take to fall the 31.7 m?
- A) More than 2.54 sec
 - B) Almost 2.54 sec.
 - C) Less than 2.54 sec
 - D) Exactly 2.54 sec
 - E) Much less than 2.54 sec
31. A freely falling object has a constant acceleration of 9.8 m/s^2 . This means that
- A) the object's displacement changes by 9.8 m every second squared.
 - B) the object's speed increases by 9.8 m/s each second.
 - C) the object's acceleration increases by 9.8 m/s^2 each second.
 - D) the object travels 9.8 m each second.
32. An object that is moving with an acceleration different from zero will always have a(n) _____ velocity.
- A) changing
 - B) increasing
 - C) constant
 - D) decreasing
33. The distance traveled by a dropped object in free fall is directly proportional to
- A) the time squared.
 - B) its weight.
 - C) its mass.
 - D) none of these.
34. Which of the following statements is *not* true?
- A) Displacement has a direction and a magnitude.
 - B) Acceleration has a magnitude only.
 - C) Speed has a magnitude only.
 - D) Velocity has a magnitude and a direction.
35. All the following may be represented by vectors *except*
- A) velocity.
 - B) acceleration.
 - C) speed.
 - D) displacement.

36. An object in uniform circular motion has
- A) constant acceleration.
 - B) variable radial distances.
 - C) constant velocity.
 - D) constant speed.
37. In the equation $a_c = v^2/r$ for centripetal acceleration, the r stands for
- A) diameter.
 - B) distance.
 - C) radius.
 - D) rate.
38. In the equation $a_c = v^2/r$ for centripetal acceleration, the v stands for
- A) volume.
 - B) very.
 - C) speed.
 - D) velociraptor.
39. An object travels in a circle of radius 10.0 m with a constant speed of 3.0 m/s. What is the direction of its acceleration?
- A) Toward the center of the circle
 - B) Normal to the plane of the circle
 - C) Insufficient data given for determination
 - D) Tangential to the circle
 - E) None of these
40. Centripetal means
- A) center seeking
 - B) pulls outward
 - C) constant
 - D) fast
 - E) none of these
41. The magnitude of the acceleration of an object moving in a circle at constant speed is
- A) variable.
 - B) directly proportional to the speed squared.
 - C) directly proportional to the speed.
 - D) directly proportional to the radius of the circle squared.

42. The direction of the acceleration of an object moving in a circle at constant speed is
- A) changing, but pointing in a predictable direction.
 - B) constant and pointing in only one direction.
 - C) constant and pointing in two directions.
 - D) none of these
43. The magnitude of the acceleration of an object moving in a circle at constant speed is
- A) inversely proportional to the speed squared.
 - B) inversely proportional to the speed.
 - C) inversely proportional to the radius of the circle squared.
 - D) inversely proportional to the radius of the circle.
44. If the speed of an object in circular motion is increased by a factor of 5, its centripetal acceleration for the same radius will be multiplied by a factor of
- A) 0.04.
 - B) 0.2.
 - C) 2.24.
 - D) 25.
 - E) 5.
45. A projectile's vertical velocity component
- A) changes most rapidly near the top of its trajectory.
 - B) changes at a constant rate.
 - C) changes most rapidly near the bottom of its trajectory.
 - D) does not change.
46. A projectile's horizontal velocity component (ignoring air resistance)
- A) does not change.
 - B) changes most rapidly near the bottom of its trajectory.
 - C) changes at a variable rate.
 - D) changes at a constant rate.
47. In projectile motion, which of the following is *not* constant?
- A) Vertical velocity
 - B) Horizontal velocity
 - C) Acceleration
 - D) None of these

48. A golfer hits a ball on a level fairway at an angle of 55° relative to the horizontal, and it lands on the green. Another golfer hits a ball with the same speed but at another angle, and it lands on the green by the other ball. What was the launch angle for the second golfer?
- A) 35°
 - B) 25°
 - C) 40°
 - D) 45°
 - E) 15°
49. A golfer hits a ball on a level fairway at an angle of 35° relative to the horizontal, and it lands on the green. Another golfer hits a ball with the same speed but at an angle of 55° , and it lands on the green by the other ball. Which statement is accurate for this situation?
- A) One ball is in the air longer than the other.
 - B) One ball experiences a greater acceleration while in free flight.
 - C) One ball experiences a smaller acceleration while in free flight.
 - D) Two balls hit at the same speed but different angles will always land in the same location.
 - E) Two balls hit at the same speed but different angles can never land in the same location.
50. When running and jumping to score, a basketball player seems to “hang” in the air because
- A) his or her acceleration is zero.
 - B) his or her horizontal velocity is quite small.
 - C) both components of motion are zero.
 - D) his or her vertical velocity is quite small.
 - E) levitation is possible with practice.
51. A continuous change in position is called _____.
52. The straight-line distance and direction between two points are, together, called _____.
53. Distance is a(n) _____ quantity.
54. A speedometer registers _____.

55. A compass registers _____.
56. Speed is a(n) _____ quantity.
57. For there to be an acceleration, there must necessarily be a change in _____.
58. If an object has a constant velocity, then its acceleration is _____.
59. In free fall, the _____ is constant.
60. Physics deals with matter, motion, force, and _____.
61. Physics deals with force, energy, motion, and _____.
62. Free-fall motion neglects _____.
63. A rifle bullet shot horizontally has a vertical acceleration of _____.
64. Dropped objects on the Moon fall at a slower rate than on Earth because of a smaller _____.
65. The distance a dropped object travels is proportional to the _____ of the time.
66. In straight-line motion, if a moving object slows down, the direction of the acceleration is _____ the direction of the velocity.
67. In straight-line motion, if a moving object speeds up, the direction of the acceleration is _____ the direction of the velocity.
68. On Earth, the magnitude of the acceleration of a vertical projectile at its maximum height is equal to _____.

69. On Earth, the magnitude of the velocity of a vertical projectile at its maximum height is equal to _____.
70. A(n) _____ quantity has both magnitude and direction.
71. A(n) _____ quantity has only magnitude.
72. Temperature is an example of a(n) _____ quantity.
73. An object moving in a circle with a constant speed has a(n) _____ directed toward the center of the circle.
74. _____ acceleration is necessary for uniform circular motion.
75. What two quantities are constant in uniform circular motion? _____ and _____
76. The SI unit of centripetal acceleration is _____.
77. The centripetal acceleration of an automobile in uniform circular motion on a flat circular track is supplied by _____.
78. For an object in uniform circular motion, the acceleration points toward _____.
79. A rifle bullet shot horizontally at a velocity of 9.8 m/s has a horizontal acceleration of _____.
80. Two objects are in uniform circular motion at the same speed but at different radii. The one with the _____ radius has the largest centripetal acceleration.

81. At the maximum height of a projectile launched at an angle to the horizontal, the projectile's velocity is in a _____ direction.
82. Under ideal conditions, a projectile with a given initial speed at an angle of 85° has the same range as a projectile at an angle of _____ with the same initial speed.
83. Because of air resistance, an object falling a great distance may reach a _____ velocity.
84. A student travels from St. Louis to Indianapolis, a distance of 210 mi, in 6.0 h. The return trip over the same route takes 7.0 h. What is the average speed for
- the first half of the trip?
 - the second half of the trip?
 - the total trip?
85. On a trip, a family travels 200 km in 2.5 h on the first day, 300 km in 4.0 h on the second day, and 250 km in 3.5 h on the third day. What was the average speed, in kilometers per hour, for the total trip?
86. An automobile traveling on a straight, level road at 15 km/h speeds up to 90 km/h in 30 s. What was the magnitude of the auto's acceleration, in meters per second squared?
87. An object is dropped ($g = 9.80 \text{ m/s}^2$) and falls for 5.00 s before hitting the ground.
- How far has the object fallen?
 - What is the final velocity?
 - What is the final acceleration?
88. A ball is thrown up in the air with an initial velocity of 78.4 m/s upward. How long does it take the ball
- to go up?
 - to come down after reaching maximum height?

89. The following data refer to a car traveling west:

t (s)	0	1	2	3	4

v (m/s)	30	25	20	15	10

Find the magnitude and direction of the acceleration.

90. A car travels at a constant speed of 100.0 km/h around a circular track with a diameter of 1.00 km. What is the magnitude of the car's centripetal acceleration, and what supplies this?

91. The following are data for an accelerating car:

t (s)	0	5	10	15	20

v (m/s)	0	3	6	9	12

- a. Is this car undergoing uniform acceleration?
b. If so, what is the acceleration?

92. A ball dropped from the top of a building hits the ground 8.0 s later. How high is the building (in meters)?

93. On the Moon, what is the approximate value for the acceleration due to gravity?

94. A stone is dropped from the top of a well that has water in it at a depth of 65.0 m. How long does it take the stone to reach the water?

95. A rock dropped down a well takes 1.8 s to hit the water. How far below the top of the well is the surface of the water?

96. What is the displacement of a hiker who travels 3.0 km east and then 4.0 km north?

97. An ant on a picnic table travels 30 cm eastward, then 15 cm northward, then 20 cm westward, and finally 15 cm southward. What is the magnitude of its net displacement?

Answer Key

1. C
2. D
3. B
4. B
5. D
6. A
7. B
8. E
9. B
10. E
11. A
12. D
13. B
14. E
15. D
16. B
17. B
18. A
19. A
20. C
21. A
22. D
23. B
24. A
25. A
26. A
27. C
28. A
29. C
30. D
31. B
32. A
33. A
34. B
35. C
36. D
37. C
38. C
39. A
40. A
41. B
42. A
43. D
44. D

- 45. B
- 46. A
- 47. A
- 48. A
- 49. A
- 50. D
- 51. motion
- 52. displacement
- 53. scalar
- 54. instantaneous speed
- 55. direction
- 56. scalar
- 57. velocity
- 58. zero
- 59. acceleration
- 60. energy
- 61. matter
- 62. frictional effects, or air resistance
- 63. 9.8 m/s^2 , or 32 ft/s^2 (gravity)
- 64. acceleration due to gravity
- 65. square
- 66. opposite to, or antiparallel to
- 67. along, the same as, or parallel to
- 68. g , or 9.8 m/s^2
- 69. zero
- 70. vector
- 71. scalar
- 72. scalar
- 73. acceleration
- 74. Centripetal
- 75. radial distance (radius); speed
- 76. meters per second squared (m/s^2)
- 77. friction
- 78. the center of the circle
- 79. zero
- 80. smallest or least
- 81. horizontal
- 82. 5°
- 83. terminal
- 84. a. 35 mi/h
b. 30 mi/h
c. 32 mi/h
- 85. 75 km/h
- 86. 0.69 m/s^2
- 87. a. 123 m
b. 49 m/s, downward

- c. 9.80 m/s^2 , downward
- 88. a. 8.0 s
b. 8.0 s
- 89. -5.0 m/s^2 , or 5.0 m/s^2 east
- 90. 1.54 m/s^2 , friction
- 91. a. Yes
b. 0.6 m/s^2
- 92. 310 m (rounded to two significant figures)
- 93. 1.6 m/s^2
- 94. 3.6 s
- 95. 16 m
- 96. 5.0 km
- 97. 10 cm