

Chapter 02 - Motion [test-bank-an-introduction-to-physical-science-15e-shipman](#)

1. Which one of the following is *not* an area of physics?

- a. Mechanics
- b. Optics
- c. Algebra
- d. Acoustics

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

4. Displacement divided by time gives

- a. average acceleration.
- b. average velocity.
- c. average speed.
- d. average distance.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

5. Average speed multiplied by time gives

- a. average acceleration.
- b. displacement.
- c. instantaneous speed.

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d. distance.

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

6. Distance covered per unit of time is called

- a. speed.
- b. acceleration.
- c. velocity.
- d. displacement.

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

7. The straight-line distance and direction between two points are, together, called

- a. velocity.
- b. displacement.
- c. distance.
- d. acceleration.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

8. The magnitudes of two horizontal displacements are 4 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. -13 m.
- b. -5 m.
- c. 5 m.
- d. 13 m.
- e. 4 m.

ANSWER:

e

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

b

POINTS:

1

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QUESTION TYPE:

Multiple Choice

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

ANSWER:

e

POINTS:

1

QUESTION TYPE:

Multiple Choice

11. If the instantaneous velocity of an object is constant, then so is its

- a. velocity.
- b. distance.
- c. acceleration.
- d. displacement.

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

12. The rate at which an object's velocity changes with time is called its

- a. instantaneous velocity.
- b. motion.
- c. speed.
- d. acceleration.

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

13. An automobile's acceleration may be changed by using the

- a. windshield wipers.
- b. steering wheel.
- c. radio.
- d. horn.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

14. An automobile's acceleration *cannot* be changed by using the

- a. gas pedal.
- b. brake pedal.

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- c. steering wheel.
- d. stick shift.
- e. turn signal.

ANSWER:

e

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

16. For which of the following is the acceleration constant?

- a. Nonuniform speed
- b. Free fall
- c. Uniform circular motion
- d. None of these

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

17. Velocity is similar to speed, but a _____ is also involved in velocity.

- a. acceleration
- b. direction
- c. position
- d. scalar

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

a

POINTS:

1

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QUESTION TYPE:

Multiple Choice

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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

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23. As a block slides down a 33° 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.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

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- d. an acceleration that depends on its mass.

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

28. An object with a mass of 5 kg is dropped and takes 9 s to hit the ground. Then another object with a mass of 10 kg is dropped from the same point. How long does it take to hit the ground?

- a. 9 s
- b. 18 s
- c. 5 s
- d. 81 s
- e. 729 s

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

29. A car is moving down a freeway in a straight line at a constant rate of 32.0 m/s for 3.0 s. Its acceleration is

- a. 9.8 m/s^2 .
- b. 9.8 m/s.
- c. zero.
- d. 32.0 m/s.
- e. 11.0 m/s^2 .

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

30. An object is dropped from a vertical distance of 25.5 m above the ground, and it takes 2.28 sec to fall that distance. A second identical object is launched from the same height, with a horizontal velocity of 45.9 m/s. How long does the second object take to fall the 25.5 m?

- a. More than 2.28 sec
- b. Almost 2.28 sec.
- c. Less than 2.28 sec
- d. Exactly 2.28 sec
- e. Much less than 2.28 sec

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

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- d. the object travels 9.8 m each second.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

35. All the following may be represented by vectors *except*

- a. velocity.
- b. acceleration.
- c. speed.
- d. displacement.

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

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36. An object in uniform circular motion has

- a. constant acceleration.
- b. variable radial distances.
- c. constant velocity.
- d. constant speed.

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

37. In the equation $a_c = v^2/r$ for centripetal acceleration, the r stands for

- a. diameter.
- b. distance.
- c. radius.
- d. rate.

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

38. In the equation $a_c = v^2/r$ for centripetal acceleration, the v stands for

- a. volume.
- b. very.
- c. speed.
- d. velociraptor.

ANSWER:

c

POINTS:

1

QUESTION TYPE:

Multiple Choice

39. An object travels in a circle of radius 2.0 m with a constant speed of 4.0 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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

40. Centripetal means

- a. center seeking
- b. pulls outward

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- c. constant
- d. fast
- e. none of these

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

b

POINTS:

1

QUESTION TYPE:

Multiple Choice

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

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

44. If the speed of an object in circular motion is increased by a factor of 3, its centripetal acceleration for the same radius will be multiplied by a factor of

- a. 0.111.
- b. 0.333.
- c. 1.73.
- d. 9.
- e. 3.

ANSWER:

d

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POINTS: 1
QUESTION TYPE: Multiple Choice

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.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

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.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

47. In projectile motion, which of the following is *not* constant?
- a. Vertical velocity
 - b. Horizontal velocity
 - c. Acceleration
 - d. None of these

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

48. A golfer hits a ball on a level fairway at an angle of 60° 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. 30°
- b. 20°
- c. 45°
- d. 40°
- e. 10°

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

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49. A golfer hits a ball on a level fairway at an angle of 30° relative to the horizontal, and it lands on the green. Another golfer hits a ball with the same speed but at an angle of 60° , 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.

ANSWER:

a

POINTS:

1

QUESTION TYPE:

Multiple Choice

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.

ANSWER:

d

POINTS:

1

QUESTION TYPE:

Multiple Choice

51. A continuous change in position is called _____.

ANSWER:

motion

POINTS:

1

QUESTION TYPE:

Objective Short Answer

52. The straight-line distance and direction between two points are, together, called _____.

ANSWER:

displacement

POINTS:

1

QUESTION TYPE:

Objective Short Answer

53. Distance is a(n) _____ quantity.

ANSWER:

scalar

POINTS:

1

QUESTION TYPE:

Objective Short Answer

54. A speedometer registers _____.

ANSWER:

instantaneous speed

POINTS:

1

QUESTION TYPE:

Objective Short Answer

55. A compass registers _____.

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ANSWER: direction
POINTS: 1
QUESTION TYPE: Objective Short Answer

56. Speed is a(n) _____ quantity.

ANSWER: scalar
POINTS: 1
QUESTION TYPE: Objective Short Answer

57. For there to be an acceleration, there must necessarily be a change in _____.

ANSWER: velocity
POINTS: 1
QUESTION TYPE: Objective Short Answer

58. If an object has a constant velocity, then its acceleration is _____.

ANSWER: zero
POINTS: 1
QUESTION TYPE: Objective Short Answer

59. In free fall, the _____ is constant.

ANSWER: acceleration
POINTS: 1
QUESTION TYPE: Objective Short Answer

60. Physics deals with matter, motion, force, and _____.

ANSWER: energy
POINTS: 1
QUESTION TYPE: Objective Short Answer

61. Physics deals with force, energy, motion, and _____.

ANSWER: matter
POINTS: 1
QUESTION TYPE: Objective Short Answer

62. Free-fall motion neglects _____.

ANSWER: frictional effects, or air resistance
POINTS: 1
QUESTION TYPE: Objective Short Answer

63. A rifle bullet shot horizontally has a vertical acceleration of _____.

ANSWER: 9.8 m/s^2 , or 32 ft/s^2 (gravity)
POINTS: 1
QUESTION TYPE: Subjective Short Answer

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64. Dropped objects on the Moon fall at a slower rate than on Earth because of a smaller _____.

ANSWER: acceleration due to gravity

POINTS: 1

QUESTION TYPE: Objective Short Answer

65. The distance a dropped object travels is proportional to the _____ of the time.

ANSWER: square

POINTS: 1

QUESTION TYPE: Objective Short Answer

66. In straight-line motion, if a moving object slows down, the direction of the acceleration is _____ the direction of the velocity.

ANSWER: opposite to, or antiparallel to

POINTS: 1

QUESTION TYPE: Objective Short Answer

67. In straight-line motion, if a moving object speeds up, the direction of the acceleration is _____ the direction of the velocity.

ANSWER: along, the same as, or parallel to

POINTS: 1

QUESTION TYPE: Objective Short Answer

68. On Earth, the magnitude of the acceleration of a vertical projectile at its maximum height is equal to _____.

ANSWER: g , or 9.8 m/s^2

POINTS: 1

QUESTION TYPE: Subjective Short Answer

69. On Earth, the magnitude of the velocity of a vertical projectile at its maximum height is equal to _____.

ANSWER: zero

POINTS: 1

QUESTION TYPE: Objective Short Answer

70. A(n) _____ quantity has both magnitude and direction.

ANSWER: vector

POINTS: 1

QUESTION TYPE: Objective Short Answer

71. A(n) _____ quantity has only magnitude.

ANSWER: scalar

POINTS: 1

QUESTION TYPE: Objective Short Answer

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72. Temperature is an example of a(n) _____ quantity.

ANSWER: scalar

POINTS: 1

QUESTION TYPE: Objective Short Answer

73. An object moving in a circle with a constant speed has a(n) _____ directed toward the center of the circle.

ANSWER: acceleration

POINTS: 1

QUESTION TYPE: Objective Short Answer

74. _____ acceleration is necessary for uniform circular motion.

ANSWER: Centripetal

POINTS: 1

QUESTION TYPE: Objective Short Answer

75. What two quantities are constant in uniform circular motion? _____ and _____

ANSWER: radial distance (radius); speed

POINTS: 1

QUESTION TYPE: Objective Short Answer

76. The SI unit of centripetal acceleration is _____.

ANSWER: meters per second squared (m/s^2)

POINTS: 1

QUESTION TYPE: Subjective Short Answer

77. The centripetal acceleration of an automobile in uniform circular motion on a flat circular track is supplied by _____.

ANSWER: friction

POINTS: 1

QUESTION TYPE: Objective Short Answer

78. For an object in uniform circular motion, the acceleration points toward _____.

ANSWER: the center of the circle

POINTS: 1

QUESTION TYPE: Objective Short Answer

79. A rifle bullet shot horizontally at a velocity of 9.8 m/s has a horizontal acceleration of _____.

ANSWER: zero

POINTS: 1

QUESTION TYPE: Objective Short Answer

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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.

ANSWER: smallest or least

POINTS: 1

QUESTION TYPE: Objective Short Answer

81. At the maximum height of a projectile launched at an angle to the horizontal, the projectile's velocity is in a _____ direction.

ANSWER: horizontal

POINTS: 1

QUESTION TYPE: Objective Short Answer

82. Under ideal conditions, a projectile with a given initial speed at an angle of 15° has the same range as a projectile at an angle of _____ with the same initial speed.

ANSWER: 75°

POINTS: 1

QUESTION TYPE: Subjective Short Answer

83. Because of air resistance, an object falling a great distance may reach a _____ velocity.

ANSWER: terminal

POINTS: 1

QUESTION TYPE: Objective Short Answer

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

a. the first half of the trip?

b. the second half of the trip?

c. the total trip?

ANSWER: a. 35 mi/h
b. 30 mi/h
c. 32 mi/h

POINTS: 1

QUESTION TYPE: Subjective Short Answer

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?

ANSWER: 75 km/h

POINTS: 1

QUESTION TYPE: Objective Short Answer

86. An automobile traveling on a straight, level road at 25 km/h speeds up to 70 km/h in 20 s. What was the magnitude of the auto's acceleration, in meters per second squared?

ANSWER: 0.62 m/s^2

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POINTS:

1

QUESTION TYPE:

Subjective Short Answer

87. An object is dropped ($g = 9.80 \text{ m/s}^2$) and falls for 5.00 s before hitting the ground.

- a. How far has the object fallen?
- b. What is the final velocity?
- c. What is the final acceleration?

ANSWER:

- a. 123 m
- b. 49 m/s, downward
- c. 9.80 m/s^2 , downward

POINTS:

1

QUESTION TYPE:

Subjective Short Answer

88. A ball is thrown up in the air with an initial velocity of 58.8 m/s upward. How long does it take the ball

- a. to go up?
- b. to come down after reaching maximum height?

ANSWER:

- a. 6.0 s
- b. 6.0 s

POINTS:

1

QUESTION TYPE:

Subjective Short Answer

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.

ANSWER:

-5.0 m/s^2 , or 5.0 m/s^2 east

POINTS:

1

QUESTION TYPE:

Subjective Short Answer

90. A car travels at a constant speed of 95.0 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?

ANSWER:

1.39 m/s^2 , friction

POINTS:

1

QUESTION TYPE:

Subjective Short Answer

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?

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ANSWER:

- a. Yes
- b. 0.6 m/s^2

POINTS:

1

QUESTION TYPE:

Subjective Short Answer

92. A ball dropped from the top of a building hits the ground 9.0 s later. How high is the building (in meters)?

ANSWER:

400 m (rounded to two significant figures)

POINTS:

1

QUESTION TYPE:

Objective Short Answer

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

ANSWER:

1.6 m/s^2

POINTS:

1

QUESTION TYPE:

Subjective Short Answer

94. A stone is dropped from the top of a well that has water in it at a depth of 30.0 m. How long does it take the stone to reach the water?

ANSWER:

2.5 s

POINTS:

1

QUESTION TYPE:

Objective Short Answer

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?

ANSWER:

16 m

POINTS:

1

QUESTION TYPE:

Objective Short Answer

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

ANSWER:

5.0 km

POINTS:

1

QUESTION TYPE:

Objective Short Answer

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:

10 cm

POINTS:

1

QUESTION TYPE:

Objective Short Answer