Student name:_____

MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.

1) Which of the following specifications would allow you to precisely meet someone for an appointment?

A) Meet me at my car.
B) Meet me at my office, room 203 in Williams Hall on campus.
C) Meet me at my office, room 203 in Williams Hall on campus at 2:30 PM.
D) Meet me at my office.
E) Meet me at 2:30 PM.

2) Displacement is

A) the distance traveled from the first position to the final position.
B) the distance from the origin to the final position.
C) the change in position from the first position the final position.
D) the change in position from the origin to the final position.

3) If an object is located 20 m to the right of the origin at 1:00 PM, and later the object is located 30 m to the right of the origin at 2:00 PM, then the displacement from 1:00 PM to 2:00 PM is

A) 50 m to the right.
B) 30 m to the right.
C) 25 m to the right.
D) 20 m to the right.
E) 10 m to the right.

4) If an object is located 20 m to the left of the origin at 1:00 PM, and later the object is located 30 m to the right of the origin at 2:00 PM, then the displacement from 1:00 PM to 2:00 PM is

A) 50 m to the right.
B) 30 m to the right.
C) 25 m to the right.
D) 20 m to the left.
E) 10 m to the left.

5) If an object is located 20 m to the right of the origin at 1:00 PM, and later the object is located 30 m to the left of the origin at 2:00 PM, then the displacement from 1:00 PM to 2:00 PM is

A) 50 m to the right.
B) 50 m to the left.
C) 30 m to the right.
D) 30 m to the left.
E) 10 m to the left.

6) A walker walks 30 m from the origin toward the EAST to point A. She then walks from point A 20 m more toward the EAST to point B. The walker's total displacement from the origin is

A) 50 m toward the EAST.
B) 30 m toward the WEST.
C) 20 m toward the WEST.
D) 10 m toward the EAST.
E) 10 m toward the WEST.

7) A walker walks 30 m from the origin toward the EAST to point A. She then walks from point A 20 m more toward the WEST to point B. The walker's total displacement from the origin is

A) 50 m toward the EAST.
B) 30 m toward the WEST.
C) 20 m toward the WEST.
D) 10 m toward the EAST.
E) 10 m toward the WEST.

8) A walker walks 30 m from the origin toward the WEST to point A. She then walks from point A, 20 m more toward the EAST to point B. The walker's total displacement from the origin is

A) 50 m toward the EAST.
B) 30 m toward the WEST.
C) 20 m toward the WEST.
D) 10 m toward the EAST.
E) 10 m toward the WEST.

9) A runner runs 10 m from the origin toward the WEST to point A. He then runs from point A 20 m more toward the WEST to point B. He then runs from point B 30 m more toward the WEST to point C. The runner's total displacement from the origin to point C is

A) 60 m toward the WEST.
B) 50 m toward the WEST.
C) 20 m toward the WEST.
D) 10 m toward the WEST.
E) 0 m.

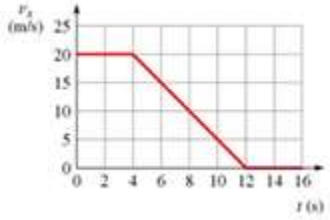
10) A runner runs 10 m from the origin toward the WEST to point A. He then runs from point A 20 m more toward the EAST to point B. He then runs from point B 30 m more toward the WEST to point C. The runner's total displacement from the origin to point C is

A) 60 m toward the WEST.
B) 50 m toward the WEST.
C) 20 m toward the WEST.
D) 10 m toward the WEST.
E) 0 m.

11) A runner runs 10 m from the origin toward the WEST to point A. He then runs from point A 20 m more toward the WEST to point B. He then runs from point B 30 m more toward the EAST to point C. The runner's total displacement from the origin to point C is

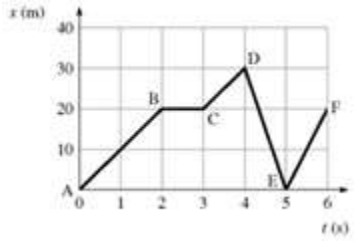
A) 60 m toward the WEST.
B) 50 m toward the EAST.
C) 20 m toward the WEST.
D) 10 m toward the EAST.
E) 0 m.

12) The graph shows the speedometer reading of a car as it comes to a stop along a straight-line path. How far does the car move between t = 0 s and t = 16 s?



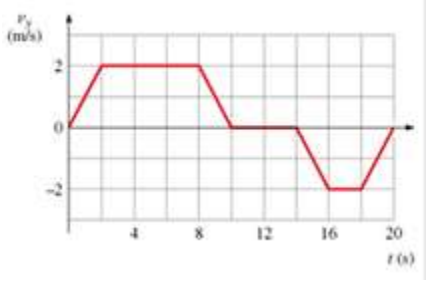
A) 130 m
B) 140 m
C) 150 m
D) 160 m

13) The figure is a graph of an object moving in a straight line. Solve graphically to determine which section of the path has the highest speed.



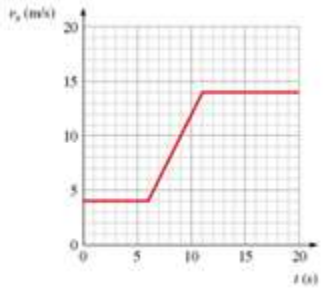
A) DE
B) EF
C) CD
D) AB

14) The figure is a graph of the vertical velocity versus time for an elevator. Solve graphically for the height of the elevator above the starting point at t = 20 s.



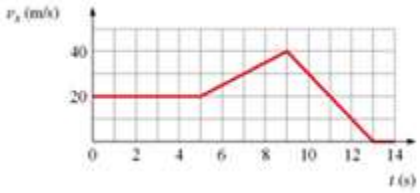
A) 4.0 m
B) 16.0 m
C) 0.0 m
D) 8.0 m

15) The figure is a graph of $v_x(t)$ for a car. Solve graphically for the distance traveled from t = 10 s to t = 15 s.



A) 75 m
B) 70 m
C) 67 m
D) 69 m

16) The figure shows the graph of v_x versus time for an object moving along the x-axis. Solve graphically for the distance traveled from t = 9.0 s to t = 13.0 s.



A) 60 m
B) 84 m
C) 76 m
D) 80 m

17) A walker starts at the origin at 1:00 PM and walks 3.0 km from the origin toward the WEST to point A. She arrives at point A at 2:30 PM. She then walks from point A 2.0 km toward the WEST to point B and arrives at point B at 3:45 PM. The walker's average velocity for the entire trip is

A) 1.8 km/hr toward the EAST.
B) 1.8 km/hr toward the WEST.
C) 1.3 km/hr toward the WEST.
D) 1.3 km/hr toward the EAST.
E) 0.36 km/hr toward the WEST.

18) A car travels a distance of 100 km in 2.00 hours. It then travels an additional distance of 60.0 km in 1.00 hour. The average speed of the car for the entire trip is

A) 80.0 km/hr.
B) 60.0 km/hr.
C) 53.3 km/hr.
D) 50.0 km/hr.
E) 46.7 km/hr.

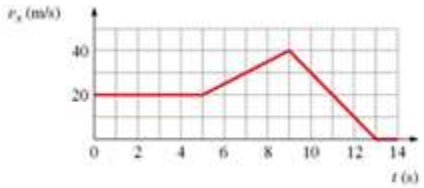
19) A car travels at 50.0 km/hr for 2.00 hours. It then travels an additional distance of 40.0 km in 1.00 hour. The average speed of the car for the entire trip is

A) 61.0 km/hr.
B) 57.1 km/hr.
C) 53.3 km/hr.
D) 46.7 km/hr.
E) 30.0 km/hr.

20) A car travels a distance of 140 km at 70.0 km/hr. It then travels an additional distance of 60.0 km at 40.0 km/hr. The average speed is

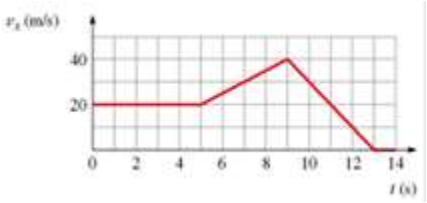
A) 61.0 km/hr.
B) 57.1 km/hr.
C) 53.3 km/hr.
D) 46.7 km/hr.
E) 45.0 km/hr.

21) The graph shows v_x versus t for an object moving along straight line. What is the average speed from t = 0 to t = 11 s?



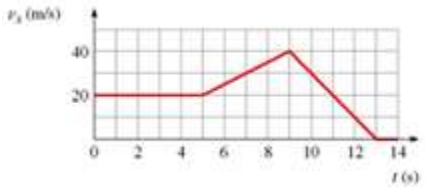
A) 25 m/s
B) 36 m/s
C) 30 m/s
D) 21 m/s

22) The graph shows v_x versus t for an object moving in a straight line. What is the average speed from t = 0 s to t = 9 s?



A) 44 m/s
B) 32 m/s
C) 22 m/s
D) 24 m/s

23) The graph shows v_x versus t for an object moving along straight line. What is the acceleration a_x at t = 11 s?

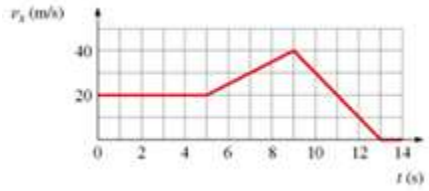


A) −10 m/s ^{2}
B) 10 m/s ^{2}
C) 22 m/s ^{2}
D) −22 m/s ^{2}

24) The figure shows the speedometer readings as a car comes to a stop. Solve graphically for the acceleration a_x at t = 7.0 s.

A) 2.5 m/s ^{2}
B) − 2.5 m/s ^{2}
C) − 2.0 m/s ^{2}
D) 2.0 m/s ^{2}

25) The figure shows the graph of v_x versus time for an object moving along the x-axis. What is the acceleration a_x at t = 7.0 s?



A) 4.0 m/s ^{2}
B) 5.0 m/s ^{2}
C) 0.5 m/s ^{2}
D) 0.4 m/s ^{2}

26) An object starts from rest and travels in a straight line with an acceleration of 2.0 m/s ^{2} for 3.0 seconds. It then reduces its acceleration to 1.0 m/s ^{2} for 5.0 additional seconds. The magnitude of the velocity at the end of the 5.0 second interval is

A) 6.0 m/s.
B) 18 m/s.
C) 8.0 m/s.
D) 18 m/s.
E) 11 m/s.

27) An object starts from rest with an acceleration of 2.0 m/s ^{2} in the + x-direction for 3.0 seconds. It then reduces its acceleration to 1.0 m/s ^{2} for 5.0 additional seconds. The total distance covered is about

A) 52 m.
B) 38 m.
C) 11 m.
D) 9.0 m.
E) 7.6 m.

28) A 4.0 kg mass has a velocity of 12 m/s to the WEST. The mass experiences a constant acceleration of 2.0 m/s ^{2} to the WEST for 3.0 sec. What is the velocity of the mass at the end of the 3.0 sec interval?

A) 18 m/s to the WEST
B) 6.0 m/s to the WEST
C) 0.0 m/s
D) 6.0 m/s to the EAST
E) 18 m/s to the EAST

29) A 4.0 kg mass has a velocity of 10 m/s to the EAST. The mass undergoes a constant acceleration of 4.0 m/s ^{2} to the WEST for 3.0 sec. What is the velocity of the mass at the end of the 3.0 sec interval?

A) 22 m/s to the WEST
B) 2.0 m/s to the WEST
C) 0.0 m/s
D) 2.0 m/s to the EAST
E) 22 m/s to the EAST

30) A car traveling at 3.0 m/s has a constant acceleration of 4.0 m/s ^{2} in the same direction as the velocity. After 2.0 seconds, the speed is

A) 5.0 m/s.
B) 7.0 m/s.
C) 9.0 m/s.
D) 11 m/s.
E) 13 m/s.

31) A car traveling at 4.0 m/s has a constant acceleration of 2.0 m/s ^{2} in the same direction as the velocity. After 3.0 seconds, the magnitude of the average velocity during the acceleration is

A) 5.0 m/s.
B) 7.0 m/s.
C) 9.0 m/s.
D) 11 m/s.
E) 13.

32) A car traveling at 4.0 m/s has a constant acceleration of 2.0 m/s ^{2} in the same direction as the velocity. After 3.0 seconds, the distance traveled is

A) 21 m.
B) 17 m.
C) 10 m.
D) 13 m.
E) 9 m.

33) A boat is traveling at 4.0 m/s as it passes the starting line of a race. If the boat accelerates at 2.0 m/s ^{2} for 3.0 seconds, in the same direction as the velocity, then the magnitude of the velocity of the boat after the 3.0 seconds is

A) 21 m/s.
B) 9.0 m/s.
C) 13 m/s.
D) 10 m/s.
E) 4.0 m/s.

34) A boat is traveling at 4.0 m/s as it passes the starting line of a race. If the boat accelerates at 1.0 m/s ^{2} in the same direction as the velocity for 6.0 seconds, then the distance the boat has traveled after 6.0 seconds is

A) 42 m.
B) 18 m.
C) 26 m.
D) 20 m.
E) 14 m.

35) A boat is traveling at 4.0 m/s as it passes the starting line of a race. If the boat accelerates at 1.0 m/s ^{2} for 6.0 seconds, in the same direction as the velocity, then the magnitude of the average velocity of the boat during the 6.0 seconds is

A) 21 m/s.
B) 9.0 m/s.
C) 13 m/s.
D) 10 m/s.
E) 7.0 m/s.

36) A car starts from rest and travels a distance of 100 m in 10 seconds, with constant acceleration. The magnitude of the acceleration of the car is

A) 1.0 m/s ^{2}.
B) 2.0 m/s ^{2}.
C) 2.5 m/s ^{2}.
D) 3.0 m/s ^{2}.
E) 3.5 m/s ^{2}.

37) A car starts from rest and travels a distance of 100 m in 20 seconds, with constant acceleration. The magnitude of the velocity of the car is at the end of the 20 second interval is

A) 25 m/s.
B) 20 m/s.
C) 15 m/s.
D) 10 m/s.
E) 5.0 m/s.

38) A car starts from rest and travels a distance of 100 m in 15 seconds with a constant acceleration. The magnitude of the average velocity of the car for the 15 second interval is

A) 24.0 m/s.
B) 21.0 m/s.
C) 16.7 m/s.
D) 13.3 m/s.
E) 6.67 m/s.

39) A runner starts from rest and with an acceleration of 1.0 m/s ^{2} travels a distance of 10 meters. The time it takes the runner to cover the distance is

A) 6.3 s.
B) 5.7 s.
C) 5.0 s.
D) 4.5 s.
E) 3.8 s.

40) A runner starts from rest and with an acceleration of 2.0 m/s ^{2} travels a distance of 12 meters. The magnitude of the velocity of the runner at the end of the distance is

A) 3.4 m/s.
B) 5.7 m/s.
C) 6.9 m/s.
D) 7.5 m/s.
E) 8.1 m/s.

41) An object starts from rest and moves in a straight line with an acceleration of 2.0 m/s ^{2} for 3.0 seconds. It then reduces its acceleration to 1.0 m/s ^{2} for 5.0 additional seconds. The magnitude of the velocity is then

A) 51 m/s.
B) 38 m/s.
C) 11 m/s.
D) 9.0 m/s.
E) 7.6 m/s.

42) An object starts with an initial velocity of magnitude 4.0 m/s and accelerates at 4.0 m/s ^{2} in the same direction as the velocity for 6.0 seconds. It then accelerates at 2.0 m/s ^{2} in the opposite direction, until its velocity is the same as the initial value. What is the total distance covered? (Hint: make a graph of velocity versus time.)

A) 67 m
B) 96 m
C) 192 m
D) 216 m
E) 288 m

43) A car starting from rest travels a distance of 20.0 m with a constant acceleration of 2.0 m/s^2. The car then slows to a stop in 10.0 seconds with a constant negative acceleration. The distance traveled by the car is

A) 36 m.
B) 46 m.
C) 50 m.
D) 58 m.
E) 65 m.

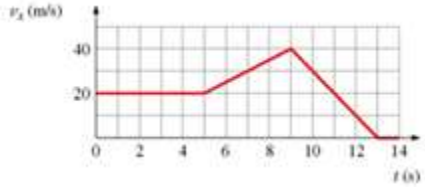
44) A baseball is pitched, reaching the batter with a speed of 37 m/s, and is hit such that it returns on the same line at 48 m/s. If the ball was in contact with the bat for 0.22 seconds, what was the magnitude of the average acceleration experienced by the ball during the time of contact?

A) 220 m/s^2
B) 41 m/s^2
C) 390 m/s^2
D) 170 m/s^2

45) You drive your car 5.0 km due east at 35 km/hr and suddenly realize that you forgot your wallet. So, you return home, driving west at 40 km/hr, and upon arrival you spend 10 minutes looking for it. Finally, you get back on the road and drive a total of 57.0 km due east. If your average velocity was 40 km/hr for the whole journey, what was your average speed during the last leg?

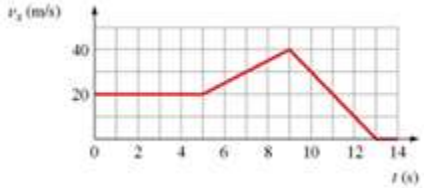
A) 49 km/hr
B) 40 km/hr
C) 45 km/hr
D) 58 km/hr

46) The figure shows the graph of v_x versus time for an object moving along the x-axis. Solve graphically for the distance traveled between t = 5.0 s and t = 9.0 s.



A) 110 m
B) 120 m
C) 100 m
D) 130 m

47) The figure shows the graph of v_x versus time for an object moving along the x-axis. Solve graphically for the average acceleration between t = 5.0 s and t = 9.0 s.



A) 4.0 m/s^2
B) 5.0 m/s^2
C) 0.5 m/s^2
D) 0.4 m/s^2

48) A rock is thrown straight up and reaches a maximum height. Which of the following describes the motion at the maximum height?

A) The velocity is zero and the acceleration is zero.
B) The velocity is maximum and the acceleration is zero.
C) The acceleration is increasing and the velocity is zero.
D) The acceleration is not changing and the velocity is zero.

49) A ball is thrown upward with a velocity of 19.6 m/s. What is its velocity after 3.00 s?

A) 9.80 m/s up
B) zero
C) 19.6 down
D) 9.80 m/s down

50) A bullet shot straight up returns to its starting point in 10 s. Ignoring air resistance, what was the initial speed of the bullet?

A) 98 m/s
B) 49 m/s
C) 25 m/s
D) 9.8 m/s

51) A ball is thrown downward from the top of a building with an initial speed of 25 m/s. It hits the ground in 2.0 s. How high is the building?

A) 70 m
B) 50 m
C) 30 m
D) 20 m

52) Two balls are thrown from the top of a building. One is thrown up and the other is thrown down, both with the same initial speed. Ignoring air resistance, what are their speeds when they hit the street?

A) They are traveling at the same speed.
B) The one thrown down is traveling faster.
C) The one thrown up is traveling faster.
D) It depends on the height of the building.

53) A ball is thrown straight up with an initial speed of 30 m/s. What is its speed after 4.2 s?

A) 72 m/s
B) 42 m/s
C) 30 m/s
D) 11 m/s

54) A ball is thrown straight up with a speed of 30.0 m/s. What is the maximum height reached by the ball?

A) 132 m
B) 92.0 m
C) 45.9 m
D) 21.3 m

55) Human reaction time is usually greater than 0.10 s. If your friend holds a ruler between your fingers and releases it without warning, how far can you expect the ruler to fall before you catch it?

A) at least 3.0 cm
B) at least 4.9 cm
C) at least 6.8 cm
D) at least 9.8 cm

56) Ball A is dropped from the top of a building. One second later ball B is dropped from the same point. As time progresses, the distance between them

A) increases.
B) decreases.
C) remains constant.
D) need more information

57) A ball is thrown straight up, reaches a maximum height, then falls to its initial height. As the ball is going up

A) both its velocity and its acceleration are downward.
B) its velocity is downward and its acceleration is upward.
C) its velocity is upward and its acceleration is downward.
D) both its velocity and its acceleration are upward.

58) A sprinter runs 100.0 m in 12.2 seconds. If he travels at constant acceleration for the first 50.0 m and then at constant velocity for the final 50.0 m, what was his peak speed?

A) 12.3 m/s
B) 17.5 m/s
C) 8.20 m/s
D) 4.10 m/s

59) A sprinter runs 100.0 m in 9.87 seconds. If he travels at constant acceleration for the first 75.0 m and then at constant velocity for the final 25.0 m, what was his acceleration during the first 75.0 m?

A) 1.58 m/s^2
B) 2.05 m/s^2
C) 2.10 m/s^2
D) 2.74 m/s^2

60) A sprinter runs 100.0 m. If he travels at constant acceleration of 1.95 m/s^2 for the first 75.0 m and then at constant velocity for the remaining distance, what was his total elapsed time for the whole race?

A) 11.3 s
B) 9.8 s
C) 10.1 s
D) 10.2 s

61) A sprinter runs 100 m. If he travels at constant acceleration of 1.95 m/s^2 for the first 6.0 s and then at constant velocity for the remaining time, what was his average velocity?

A) 9.8 m/s
B) 10.2 m/s
C) 9.9 m/s
D) 8.7 m/s

62) An electron from a heated filament in an electron gun travels with constant acceleration to the tip of the gun, where it is emitted. If the final speed of the electron is 1.5×10^5 m/s, the length of the gun from filament to tip is 1.25 cm, and the electron started from rest, what was the acceleration of the electron?

A) 9.0×10^{10} m/s^2
B) 9.0×10^9 m/s^2
C) 1.8×10^{12} m/s^2
D) 6.0×10^6 m/s^2
E) 1.8×10^9 m/s^2
F) 9.0×10^{11} m/s^2

63) A mouse is running away from a cat at a speed of 0.75 m/s. At a distance of 1.25 m from his mouse hole, the mouse accelerates at a constant rate of 0.25 m/s^2 until he reaches his hole safely. How long did it take the mouse to cover the last 1.25 m?

A) 1.4 s
B) 1.7 s
C) 1.2 s
D) 10 s

64) A mouse is running away from a cat at a speed of 0.75 m/s. At a distance of 1.25 m from his mouse hole, the mouse accelerates at a constant rate until he reaches his hole safely, 0.75 s later. What was the mouse's acceleration during the final 1.25 m of his escape?

A) 1.8 m/s^2
B) 1.2 m/s^2
C) 4.8 m/s^2
D) 2.4 m/s^2
E) 6.4 m/s^2

65) A model rocket flies straight upward with constant acceleration, undergoing a displacement of 15.0 m during its first 0.25 s of travel. What was its speed at the end of the first 0.25 s, assuming it started from rest?

A) 30 m/s
B) 60 m/s
C) 11 m/s
D) 120 m/s

66) A small golden statue falls from a height of 8.2 m and lands on a pillow. If the acceleration of the statue upon striking the pillow is constant, what is the value of the acceleration if the pillow compresses by 3.9 cm as the statue comes to rest?

A) 2100 m/s^2
B) 21 m/s^2
C) 160 m/s^2
D) 210 m/s^2

67) If a flea can jump up to 45 cm above its initial starting point, with what speed is it able to leave the ground when jumping?

A) 2.1 m/s
B) 3.0 m/s
C) 8.8 m/s
D) 4.2 m/s

68) One stone is dropped from the side of a bridge, and a second is dropped from the same place a short time later (while the first stone is still in the air). What is true about the distance between the stones as a function of time after both have been dropped (and before either reaches the ground)? Ignore air resistance.

A) increases, finally reaching a constant value
B) always increases
C) is constant
D) decreases, and then reaches a constant value
E) always decreases

69) A ball is dropped at time t = 0.0 s. At t = 2.0 s, a second ball is thrown downward with speed v. What is v if at t = 4.0 s, the two balls are at the same vertical position?

A) 15 m/s
B) 25 m/s
C) 49 m/s
D) 29 m/s

Answer Key

Test name: Physics 2

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

27) A
28) A
29) B
30) D
31) B
32) A
33) D
34) A
35) E
36) B
37) D
38) E
39) D
40) C
41) C
42) E
43) E
44) C
45) D
46) B
47) B
48) D
49) D
50) B
51) A
52) A
53) D
54) C
55) B
56) A

57) C
58) A
59) C
60) D
61) D
62) F
63) A
64) D
65) D
66) A
67) B
68) B
69) D