

Import Settings:

Base Settings: Brownstone Default

Information Field: Difficulty

Information Field: Section

Highest Answer Letter: E

Multiple Keywords in Same Paragraph: No

Chapter: Chapter 2

Multiple Choice

1. A particle moves along the x axis from x_i to x_f . Of the following values of the initial and final coordinates, which results in the displacement with the largest magnitude?

- A) $x_i = 4\text{m}, x_f = 6\text{m}$
- B) $x_i = -4\text{m}, x_f = -8\text{m}$
- C) $x_i = -4\text{m}, x_f = 2\text{m}$
- D) $x_i = 4\text{m}, x_f = -2\text{m}$
- E) $x_i = -4\text{m}, x_f = 4\text{m}$

Ans: E

Difficulty: E

Section: 2-3

2. A particle moves along the x axis from x_i to x_f . Of the following values of the initial and final coordinates, which results in a negative displacement?

- A) $x_i = 4\text{m}, x_f = 6\text{m}$
- B) $x_i = -4\text{m}, x_f = -8\text{m}$
- C) $x_i = -4\text{m}, x_f = 2\text{m}$
- D) $x_i = -4\text{m}, x_f = -2\text{m}$
- E) $x_i = -4\text{m}, x_f = 4\text{m}$

Ans: B

Difficulty: E

Section: 2-3

3. The position y of a particle moving along the y axis depends on the time t according to the equation

$y = at - bt^2$. The dimensions of the quantities a and b are respectively:

- A) $L^2/T, L^3/T^2$
- B) $L/T^2, L^2/T$
- C) $L/T, L/T^2$
- D) $L^3/T, T^2/L$
- E) none of these

Ans: C

Difficulty: E

Section: 2-3

4. The average speed of a moving object during a given interval of time is always:

- A) the magnitude of its average velocity over the interval
- B) the distance covered during the time interval divided by the time interval
- C) one-half its speed at the end of the interval
- D) its acceleration multiplied by the time interval
- E) one-half its acceleration multiplied by the time interval.

Ans: B

Difficulty: E

Section: 2-4

5. Two automobiles are 150 kilometers apart and traveling toward each other. One automobile is moving at 60 km/h and the other is moving at 40 km/h. In how many hours will they meet?

- A) 2.5
- B) 2.0
- C) 1.75
- D) 1.5
- E) 1.25

Ans: D

Difficulty: E

Section: 2-4

6. A car travels 40 kilometers at an average speed of 80 km/h and then travels 40 kilometers at an average speed of 40 km/h. The average speed of the car for this 80 km trip is:

- A) 40 km/h
- B) 45 km/h
- C) 48 km/h
- D) 53 km/h
- E) 80 km/h

Ans: D

Difficulty: M

Section: 2-4

7. A car starts from Hither, goes 50 km in a straight line to Yon, immediately turns around, and returns to Hither. The time for this round trip is 2 hours. The magnitude of the average velocity of the car for this round trip is:

- A) 0
- B) 50 km/hr
- C) 100 km/hr
- D) 200 km/hr
- E) cannot be calculated without knowing the acceleration

Ans: A

Difficulty: E

Section: 2-4

8. A car starts from Hither, goes 50 km in a straight line to Yon, immediately turns around, and returns to Hither. The time for this round trip is 2 hours. The average speed of the car for this round trip is:

- A) 0
- B) 50 km/h
- C) 100 km/h
- D) 200 km/h

E) cannot be calculated without knowing the acceleration

Ans: B

Difficulty: E

Section: 2-4

9. The coordinate of an object is given as a function of time by $x = 7t - 3t^2$, where x is in meters and t is in seconds. Its average velocity over the interval from $t = 0$ to $t = 2$ s is:

- A) 5 m/s
- B) -5 m/s
- C) 11 m/s
- D) -11 m/s
- E) -14.5 m/s

Ans: B

Difficulty: M

Section: 2-4

10. The coordinate of a particle in meters is given by $x(t) = 16t - 3.0t^3$, where the time t is in seconds. The particle is momentarily at rest at $t =$

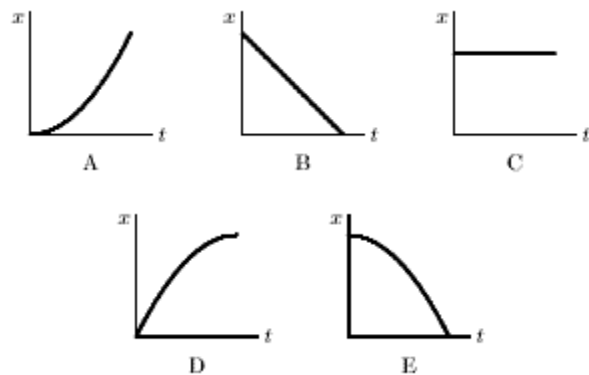
- A) 0.75 s
- B) 1.3 s
- C) 5.3 s
- D) 7.3 s
- E) 9.3 s

Ans: B

Difficulty: M

Section: 2-5

11. Which of the following five coordinate versus time graphs represents the motion of an object moving with a constant speed?



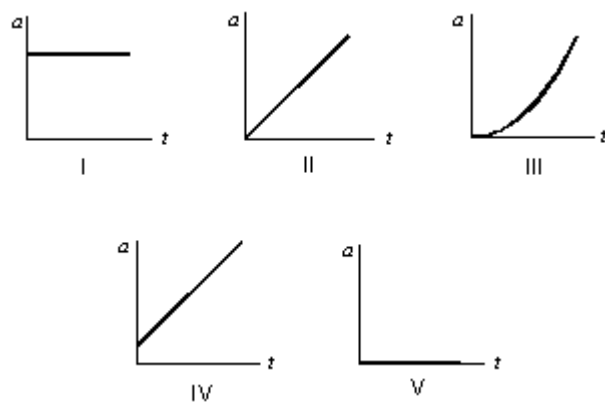
- A) A
- B) B
- C) C
- D) D
- E) E

Ans: B

Difficulty: E

Section: 2-5

12. Which of the following five acceleration versus time graphs is correct for an object moving in a straight line at a constant velocity of 20 m/s?



- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: E

Difficulty: E

Section: 2-5

13. The area under a velocity-time graph represents:

- A) acceleration
- B) change in acceleration
- C) speed
- D) change in velocity
- E) displacement

Ans: E

Difficulty: E

Section: 2-5

14. The velocity of an object is given as a function of time by $v = 4t - 3t^2$, where v is in m/s and t is in seconds. Its average velocity over the interval from $t = 0$ to $t = 2$ s:

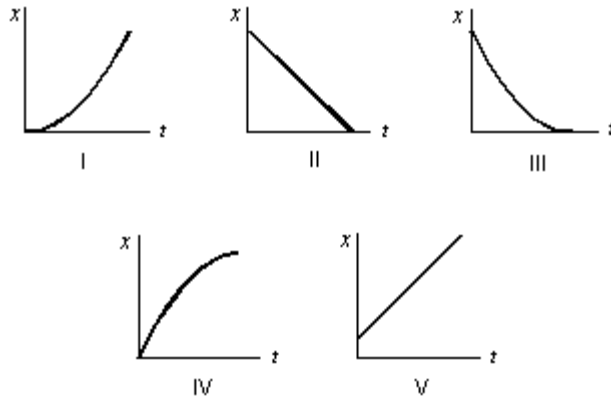
- A) is 0
- B) is -2 m/s
- C) is 2 m/s
- D) is -4 m/s
- E) cannot be calculated unless the initial position is given

Ans: A

Difficulty: M

Section: 2-4, 5

15. Which of the following five coordinate versus time graphs represents the motion of an object whose speed is increasing?



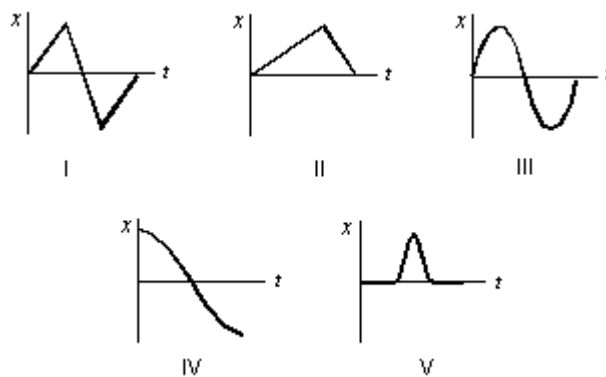
- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: A

Difficulty: E

Section: 2-6

16. A car accelerates from rest on a straight road. A short time later, the car decelerates to a stop and then returns to its original position in a similar manner, by speeding up and then slowing to a stop. Which of the following five coordinate versus time graphs best describes the motion?



- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: E

Difficulty: E
Section: 2-6

17. A ball rolls up a slope. At the end of three seconds its velocity is 20 cm/s; at the end of eight seconds its velocity is 0. What is the average acceleration from the third to the eighth second?

- A) 2.5 cm/s²
- B) 4.0 cm/s²
- C) 5.0 cm/s²
- D) 6.0 cm/s²
- E) 6.67 cm/s²

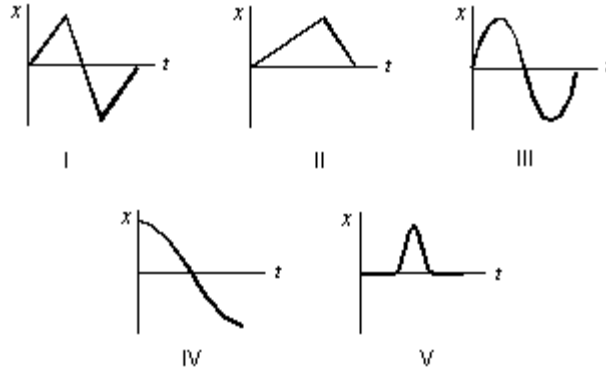
Ans: B
Difficulty: E
Section: 2-6

18. A particle moves along the x axis according to the equation $x = 6t^2$ where x is in meters and t is in seconds. Therefore:

- A) the acceleration of the particle is 6 m/s²
- B) t cannot be negative
- C) the particle follows a parabolic path
- D) each second the velocity of the particle changes by 9.8 m/s
- E) none of the above

Ans: E
Difficulty: M
Section: 2-6

19. A car accelerates from rest on a straight road. A short time later, the car decelerates to a stop and then returns to its original position in a similar manner, by speeding up and then slowing to a stop. Which of the following five coordinate versus time graphs best describes the motion?



- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: E

Difficulty: M

Section: 2-6

Disabled: Yes

Answer Locks: LOCK A, LOCK B, LOCK C, LOCK D, LOCK E

20. Over a short interval near time $t = 0$ the coordinate of an automobile in meters is given by $x(t) = 27t - 4.0t^3$, where t is in seconds. At the end of 1.0 s the acceleration of the auto is:

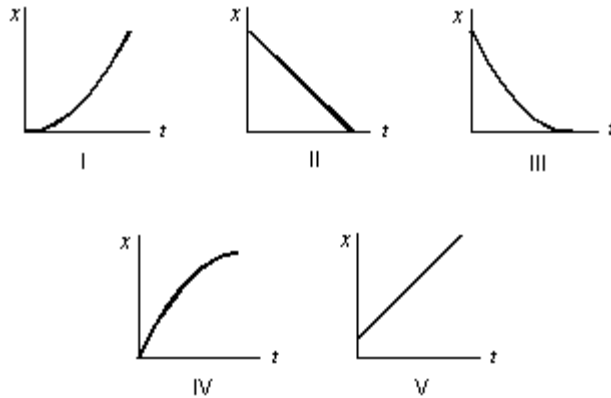
- A) 27 m/s^2
- B) 4.0 m/s^2
- C) -4.0 m/s^2
- D) -12 m/s^2
- E) -24 m/s^2

Ans: E

Difficulty: M

Section: 2-6

21. Which of the following five coordinate versus time graphs represents the motion of an object whose speed is increasing?



- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: A

Difficulty: E

Section: 2-6

Disabled: Yes

Answer Locks: LOCK A, LOCK B, LOCK C, LOCK D, LOCK E

22. The coordinate of an object is given as a function of time by $x = 4t^2 - 3t^3$, where x is in meters and t is in seconds. Its average acceleration over the interval from $t = 0$ to $t = 2$ s is:

- A) -4 m/s^2
- B) 4 m/s^2
- C) -10 m/s^2
- D) 10 m/s^2
- E) -13 m/s^2

Ans: C

Difficulty: M

Section: 2-5, 6

23. Each of four particles move along an x axis. Their coordinates (in meters) as functions of time (in seconds) are given by

particle 1: $x(t) = 3.5 - 2.7t^3$

particle 2: $x(t) = 3.5 + 2.7t^3$

particle 3: $x(t) = 3.5 + 2.7t^2$

particle 4: $x(t) = 3.5 - 3.4t - 2.7t^2$

Which of these particles have constant acceleration?

- A) All four
- B) Only 1 and 2
- C) Only 2 and 3
- D) Only 3 and 4
- E) None of them

Ans: D

Difficulty: E

Section: 2-5, 6

24. Each of four particles move along an x axis. Their coordinates (in meters) as functions of time (in seconds) are given by

particle 1: $x(t) = 3.5 - 2.7t^3$

particle 2: $x(t) = 3.5 + 2.7t^3$

particle 3: $x(t) = 3.5 + 2.7t^2$

particle 4: $x(t) = 3.5 - 3.4t - 2.7t^2$

Which of these particles is speeding up for $t > 0$?

- A) All four
- B) Only 1
- C) Only 2 and 3
- D) Only 2, 3, and 4
- E) None of them

Ans: A

Difficulty: M

Section: 2-5, 6

25. Of the following situations, which one is impossible?

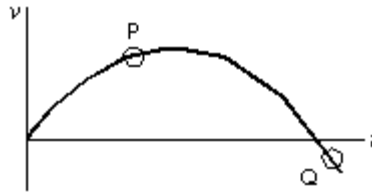
- A) A body having velocity east and acceleration east
- B) A body having velocity east and acceleration west
- C) A body having zero velocity and non-zero acceleration
- D) A body having constant acceleration and variable velocity
- E) A body having constant velocity and variable acceleration

Ans: E

Difficulty: E

Section: 2-5, 6

26. The diagram shows a velocity-time graph for a car moving in a straight line. At point Q the car must be:



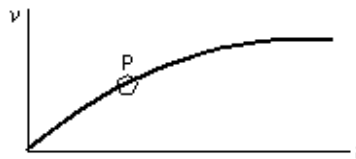
- A) moving with zero acceleration
- B) traveling downhill
- C) traveling below ground-level
- D) reducing speed
- E) traveling in the reverse direction to that at point P

Ans: E

Difficulty: E

Section: 2-5, 6

27. The diagram shows a velocity-time graph for a car moving in a straight line. At point P the car must be:



- A) moving with zero acceleration
- B) climbing the hill
- C) accelerating
- D) stationary
- E) moving at about 45° with respect to the x axis

Ans: C

Difficulty: E

Section: 2-5, 6

28. Throughout a time interval, while the speed of a particle increases as it moves along the x

axis, its velocity and acceleration might be:

- A) positive and negative, respectively
- B) negative and positive, respectively
- C) negative and negative, respectively
- D) negative and zero, respectively
- E) positive and zero, respectively

Ans: C

Difficulty: E

Section: 2-5, 6

29. A particle moves on the x axis. When its acceleration is positive and increasing:

- A) its velocity must be positive
- B) its velocity must be negative
- C) it must be slowing down
- D) it must be speeding up
- E) none of the above must be true

Ans: E

Difficulty: E

Section: 2-5, 6

30. Over a short interval, starting at time $t = 0$, the coordinate of an automobile in meters is given by

$x(t) = 27t - 4.0t^3$, where t is in seconds. The magnitudes of the initial (at $t = 0$) velocity and acceleration of the auto respectively are:

- A) 0; 12 m/s^2
- B) 0; 24 m/s^2
- C) 27 m/s ; 0
- D) 27 m/s ; 12 m/s^2
- E) 27 m/s ; 24 m/s^2

Ans: C

Difficulty: M

Section: 2-5, 6

31. Starting at time $t = 0$, an object moves along a straight line with velocity in m/s given by $v(t) = 98 - 2t^2$, where t is in seconds. When it momentarily stops its acceleration is:

- A) 0
- B) -4.0 m/s^2
- C) -9.8 m/s^2
- D) -28 m/s^2
- E) 49 m/s^2

Ans: D

Difficulty: M

Section: 2-5, 6

32. Starting at time $t = 0$, an object moves along a straight line. Its coordinate in meters is given by

$x(t) = 75t - 1.0t^3$, where t is in seconds. When it momentarily stops its acceleration is:

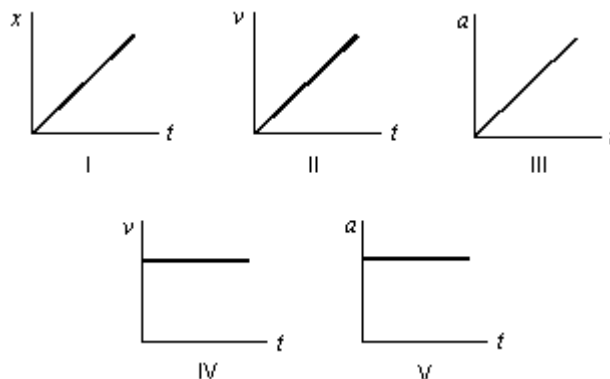
- A) 0
- B) -73 m/s^2
- C) -30 m/s^2
- D) -9.8 m/s^2
- E) $9.2 \times 10^3 \text{ m/s}^2$

Ans: C

Difficulty: M

Section: 2-5, 6

33. Consider the following five graphs (note the axes carefully). Which of these represent(s) motion at constant speed?



- A) IV only
- B) IV and V only
- C) I, II, and III only
- D) I and II only
- E) I and IV only

Ans: E

Difficulty: E

Section: 2-5, 6

34. Displacement can be obtained from:

- A) the slope of an acceleration-time graph
- B) the slope of a velocity-time graph
- C) the area under an acceleration-time graph
- D) the area under a velocity-time graph
- E) the slope of an acceleration-time graph

Ans: D

Difficulty: E

Section: 2-3, 5, 6

35. The coordinate-time graph of an object is a straight line with a positive slope. The object has:

- A) constant displacement
- B) steadily increasing acceleration
- C) steadily decreasing acceleration
- D) constant velocity
- E) steadily increasing velocity

Ans: D

Difficulty: E

Section: 2-5, 6

36. A car, initially at rest, travels 20 m in 4 s along a straight line with constant acceleration.

The acceleration of the car is:

- A) 0.4 m/s^2
- B) 1.3 m/s^2
- C) 2.5 m/s^2
- D) 4.9 m/s^2
- E) 9.8 m/s^2

Ans: C

Difficulty: M

Section: 2-7

37. A racing car traveling with constant acceleration increases its speed from 10 m/s to 30 m/s over a distance of 60 m? How long does this take?

- A) 2.0 s
- B) 4.0 s
- C) 5.0 s
- D) 8.0 s
- E) The time cannot be calculated since the speed is not constant

Ans: B

Difficulty: M

Section: 2-7

38. A car starts from rest and goes down a slope with a constant acceleration of 5 m/s^2 . After 5 seconds the car reaches the bottom of the hill. Its speed at the bottom of the hill, in meters per second, is:

- A) 1
- B) 12.5
- C) 25
- D) 50
- E) 160

Ans: C

Difficulty: E

Section: 2-7

39. A car moving with an initial velocity of 25 m/s north has a constant acceleration of 3 m/s^2 south. After 6 seconds its velocity will be:

- A) 7 m/s north
- B) 7 m/s south
- C) 43 m/s north
- D) 20 m/s north
- E) 20 m/s south

Ans: A

Difficulty: E

Section: 2-7

40. An object with an initial velocity of 12 m/s west experiences a constant acceleration of 4 m/s^2 west for 3 seconds. During this time the object travels a distance of:

- A) 12 m
- B) 24 m
- C) 36 m
- D) 54 m
- E) 144 m

Ans: D

Difficulty: E

Section: 2-7

41. How far does a car travel in 6 s if its initial velocity is 2 m/s and its acceleration is 2 m/s^2 in the forward direction?

- A) 12 m
- B) 14 m
- C) 24 m
- D) 36 m
- E) 48 m

Ans: E

Difficulty: E

Section: 2-7

42. At a stop light, a truck traveling at 15 m/s passes a car as it starts from rest. The truck travels at constant velocity and the car accelerates at 3 m/s^2 . How much time does the car take to catch up to the truck?

- A) 5 s
- B) 10 s
- C) 15 s
- D) 20 s
- E) 25 s

Ans: B

Difficulty: M

Section: 2-7

43. An object has a constant acceleration of 3 m/s^2 . The displacement versus time graph for this object has a slope:

- A) that increases with time
- B) that is constant
- C) that decreases with time
- D) of 3 m/s
- E) of 3 m/s^2

Ans: A

Difficulty: E

Section: 2-7

44. An object starts from rest at the origin and moves along the x axis with a constant acceleration of 4 m/s^2 . Its average velocity as it goes from $x = 2 \text{ m}$ to $x = 8 \text{ m}$ is:

- A) 1 m/s
- B) 2 m/s
- C) 3 m/s
- D) 5 m/s
- E) 6 m/s

Ans: E

Difficulty: M

Section: 2-6, 7

45. A drag racing car starts from rest at $t = 0$ and moves along a straight line with velocity given by $v = bt^2$, where b is a constant. The expression for the distance traveled by this car from its position at $t = 0$ is:

- A) bt^3
- B) $bt^3/3$
- C) $4bt^2$
- D) $3bt^2$
- E) $bt^{3/2}$

Ans: B

Difficulty: M

Section: 2-8

46. At time $t = 0$ a car has a velocity of 16 m/s. It slows down with an acceleration given by $-0.50t$, in m/s^2 for t in seconds. It stops at $t =$

- A) 64 s
- B) 32 s
- C) 16 s
- D) 8.0 s
- E) 4.0 s

Ans: D

Difficulty: M

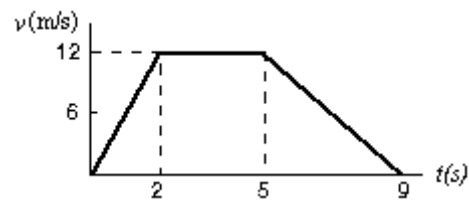
Section: 2-8

47. At time $t = 0$ a car has a velocity of 16 m/s. It slows down with an acceleration given by $-0.50t$, in m/s^2 for t in seconds. At the end of 4.0 s it has traveled:

- A) 0
- B) 12 m
- C) 14 m
- D) 25 m
- E) 59 m

Ans: E
Difficulty: H
Section: 2-8

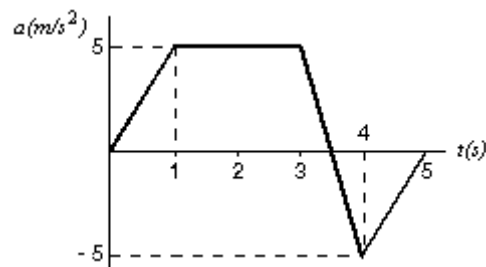
48. The graph represents the straight line motion of a car. How far does the car travel between $t = 2$ seconds and $t = 5$ seconds?



- A) 4 m
- B) 12 m
- C) 24 m
- D) 36 m
- E) 60 m

Ans: D
Difficulty: M
Section: 2-8

49. The acceleration of an object, starting from rest, is shown in the graph below. Other than at $t = 0$, when is the velocity of the object equal to zero?



- A) During the interval from 1.0 s to 3.0 s
- B) At $t = 3.5$ s
- C) At $t = 4.0$ s
- D) At $t = 5.0$ s
- E) At no other time less than or equal to 5 s.

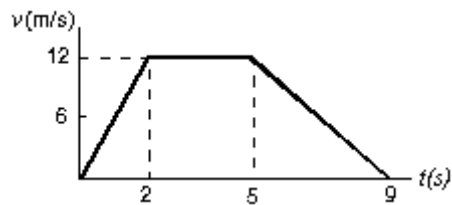
Ans: E
Difficulty: M
Section: 2-8

50. At time $t = 0$ a car has a velocity of 16 m/s. It slows down with an acceleration given by $-0.50t$, in m/s^2 for t in seconds. By the time it stops it has traveled:

- A) 15 m
- B) 31 m
- C) 62 m
- D) 85 m
- E) 100 m

Ans: D
Difficulty: H
Section: 2-8

51. The diagram represents the straight line motion of a car. Which of the following statements is true?



- A) The car accelerates, stops, and reverses
- B) The car accelerates at 6 m/s^2 for the first 2 s
- C) The car is moving for a total time of 12 s
- D) The car decelerates at 12 m/s^2 for the last 4 s
- E) The car returns to its starting point when $t = 9 \text{ s}$

Ans: B
Difficulty: M
Section: 2-5, 6, 8

52. A ball is in free fall. Upward is taken to be the positive direction. The displacement of the ball is:

- A) positive during both ascent and descent
- B) negative during both ascent and descent
- C) negative during ascent and positive during descent
- D) positive during ascent and negative during descent
- E) none of the above

Ans: D

Difficulty: E

Section: 2-9

53. A baseball is thrown vertically into the air. The acceleration of the ball at its highest point is:

- A) zero
- B) g , down
- C) g , up
- D) $2g$, down
- E) $2g$, up

Ans: B

Difficulty: E

Section: 2-9

54. Which one of the following statements is correct for an object released from rest?

- A) The average velocity during the first second of time is 4.9 m/s
- B) During each second the object falls 9.8 m
- C) The acceleration changes by 9.8 m/s every second
- D) The object falls 9.8 m during the first second of time
- E) The acceleration of the object is proportional to its weight

Ans: A

Difficulty: E

Section: 2-9

55. A freely falling body has a constant acceleration of 9.8 m/s^2 . This means that:

- A) the body falls 9.8 m during each second
- B) the body falls 9.8 m during the first second
- C) the speed of the body increases by 9.8 m/s during each second
- D) the acceleration of the body increases by 9.8 m/s^2 during each second
- E) the acceleration of the body decreases by 9.8 m/s^2 during each second

Ans: C

Difficulty: E

Section: 2-9

56. An object is shot vertically upward. While it is rising:

- A) its velocity and acceleration are both upward
- B) its velocity is upward and its acceleration is downward
- C) its velocity and acceleration are both downward
- D) its velocity is downward and its acceleration is upward
- E) its velocity and acceleration are both decreasing

Ans: B

Difficulty: E

Section: 2-9

57. An object is thrown straight up from ground level with a speed of 50 m/s . If $g = 10 \text{ m/s}^2$ its distance above ground level 1.0 second later is:

- A) 40 m
- B) 45 m
- C) 50 m
- D) 55 m
- E) 60 m

Ans: B

Difficulty: E

Section: 2-9

58. An object is thrown straight up from ground level with a speed of 50 m/s. If $g = 10 \text{ m/s}^2$ its distance above ground level 6.0 s later is:

- A) 0.00 m
- B) 270 m
- C) 330 m
- D) 480 m
- E) none of these

Ans: E

Difficulty: E

Section: 2-9

59. At a location where $g = 9.80 \text{ m/s}^2$, an object is thrown vertically down with an initial speed of 1.00 m/s. After 5.00 s the object will have traveled:

- A) 125 m
- B) 127.5 m
- C) 245 m
- D) 250 m
- E) 255 m

Ans: B

Difficulty: E

Section: 2-9

60. An object is thrown vertically upward at 35 m/s. Taking $g = 10 \text{ m/s}^2$, the velocity of the object 5 seconds later is:

- A) 7.0 m/s up
- B) 15 m/s down
- C) 15 m/s up
- D) 85 m/s down
- E) 85 m/s up

Ans: B

Difficulty: E

Section: 2-9

61. A feather, initially at rest, is released in a vacuum 12 m above the surface of the Earth. Which of the following statements is correct?

- A) The maximum velocity of the feather is 9.8 m/s
- B) The acceleration of the feather decreases until terminal velocity is reached
- C) The acceleration of the feather remains constant during the fall
- D) The acceleration of the feather increases during the fall
- E) The acceleration of the feather is zero

Ans: C

Difficulty: E

Section: 2-9

62. An object is released from rest. How far does it fall during the second second of its fall?

- A) 4.9 m
- B) 9.8 m
- C) 15 m
- D) 20 m
- E) 25 m

Ans: C

Difficulty: M

Section: 2-9

63. A heavy ball falls freely, starting from rest. Between the third and fourth second of time it travels a distance of:

- A) 4.9 m.
- B) 9.8 m.
- C) 29.4 m
- D) 34.3 m.
- E) 39.8 m.

Ans: D

Difficulty: M

Section: 2-9

64. As a rocket is accelerating vertically upward at 9.8 m/s^2 near the Earth's surface, it releases a projectile. Immediately after release the acceleration (in m/s^2) of the projectile is:

- A) 9.8 down
- B) 0
- C) 9.8 up
- D) 19.6 up
- E) none of the above

Ans: A

Difficulty: E

Section: 2-9

65. A stone is released from a balloon that is descending at a constant speed of 10 m/s . Neglecting air resistance, after 20 s the speed of the stone is:

- A) 2160 m/s
- B) 1760 m/s
- C) 206 m/s
- D) 196 m/s
- E) 186 m/s

Ans: C

Difficulty: E

Section: 2-9

66. An object dropped from a window of a tall building hits the ground in 12.0 s . If its acceleration is 9.80 m/s^2 , the height of the window above the ground is:

- A) 29.4 m
- B) 58.8 m
- C) 118 m
- D) 353 m
- E) 706 m

Ans: E

Difficulty: E

Section: 2-9

67. Neglecting the effect of air resistance a stone dropped off a 175-m high building lands on the ground in:

- A) 3 s
- B) 4 s
- C) 6 s
- D) 18 s
- E) 36 s

Ans: C

Difficulty: E

Section: 2-9

68. A stone is thrown vertically upward with an initial speed of 19.5 m/s. It will rise to a maximum height of:

- A) 4.9 m
- B) 9.8 m
- C) 19.4 m
- D) 38.8 m
- E) none of these

Ans: C

Difficulty: M

Section: 2-9

69. A baseball is hit straight up and is caught by the catcher 2.0 s later. The maximum height of the ball during this interval is:

- A) 4.9 m
- B) 7.4 m
- C) 19.4 m
- D) 38.8 m
- E) 19.6 m

Ans: A

Difficulty: M

Section: 2-9

70. An object is thrown straight down with an initial speed of 4 m/s from a window which is 8 m above the ground. The time it takes the object to reach the ground is:

- A) 0.80 s
- B) 0.93 s
- C) 1.3 s
- D) 1.7 s
- E) 2.0 s

Ans: B

Difficulty: M

Section: 2-9

71. A stone is released from rest from the edge of a building roof 190 m above the ground. Neglecting air resistance, the speed of the stone, just before striking the ground, is:

- A) 43 m/s
- B) 61 m/s
- C) 120 m/s
- D) 190 m/s
- E) 1400 m/s

Ans: B

Difficulty: M

Section: 2-9

72. An object is thrown vertically upward with a certain initial velocity in a world where the acceleration due to gravity is 19.6 m/s^2 . The height to which it rises is ____ that to which the object would rise if thrown upward with the same initial velocity on the Earth. Neglect friction.

- A) half
- B) $\sqrt{2}$ times
- C) twice
- D) four times
- E) cannot be calculated from the given data

Ans: A

Difficulty: M
Section: 2-9

73. A projectile is shot vertically upward with a given initial velocity. It reaches a maximum height of 100 m. If, on a second shot, the initial velocity is doubled then the projectile will reach a maximum height of:

- A) 70.7 m
- B) 141.4 m
- C) 200 m
- D) 241 m
- E) 400 m

Ans: E
Difficulty: M
Section: 2-9

74. One object is thrown vertically upward with an initial velocity of 100 m/s and another object with an initial velocity of 10 m/s. The maximum height reached by the first object will be _____ that of the other.

- A) 10 times
- B) 100 times
- C) 1000 times
- D) 10,000 times
- E) none of these

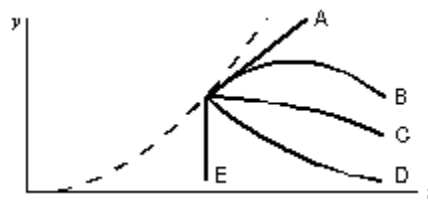
Ans: B
Difficulty: M
Section: 2-9

75. A ball is in free fall. Its acceleration is:

- A) downward during both ascent and descent
- B) downward during ascent and upward during descent
- C) upward during ascent and downward during descent
- D) upward during both ascent and descent
- E) downward at all times except at the very top, when it is zero

Ans: A
 Difficulty: E
 Section: 2-9

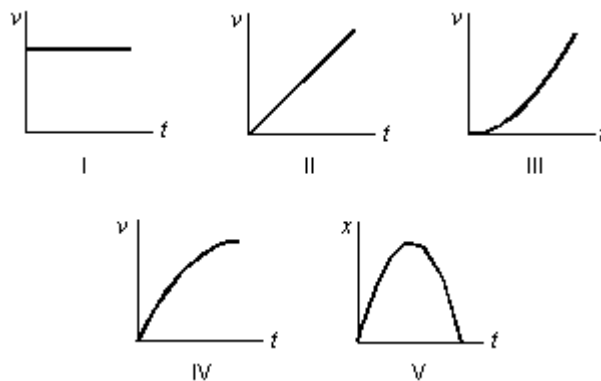
76. An elevator is moving upward with constant acceleration. The dashed curve shows the position y of the ceiling of the elevator as a function of the time t . At the instant indicated by the dot, a bolt breaks loose and drops from the ceiling. Which curve best represents the position of the bolt as a function of time?



- A) A
- B) B
- C) C
- D) D
- E) E

Ans: B
 Difficulty: E
 Section: 2-9

77. An object is dropped from rest. Which of the five following graphs correctly represents its motion? The positive direction is taken to be downward.



- A) I

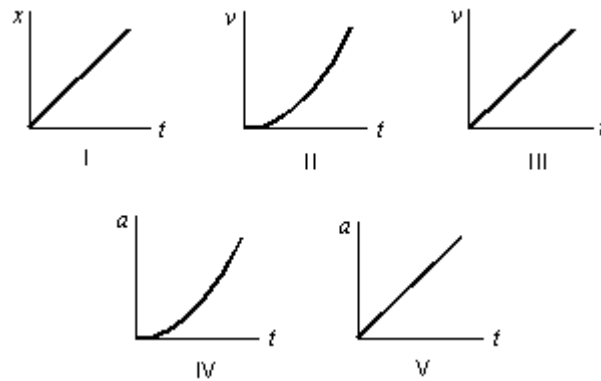
- B) II
- C) III
- D) IV
- E) V

Ans: B

Difficulty: E

Section: 2-9

78. A stone is dropped from a cliff. The graph (carefully note the axes) that best represents its motion while it falls is:



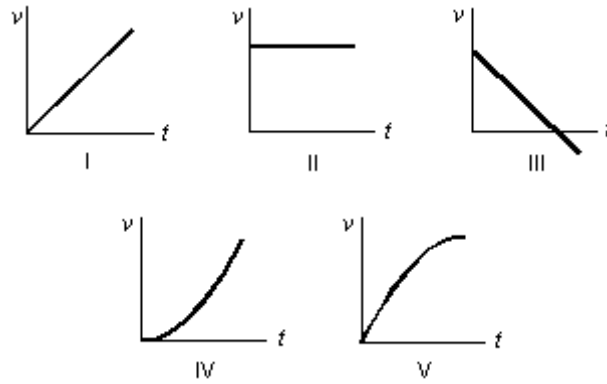
- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: C

Difficulty: E

Section: 2-9

79. An object is thrown vertically into the air. Which of the following five graphs represents the velocity (v) of the object as a function of the time (t)? The positive direction is taken to be upward.



- A) I
- B) II
- C) III
- D) IV
- E) V

Ans: C

Difficulty: E

Section: 2-9