CHAPTER 2

1. A ball is pushed with an initial velocity of 4.0 m/s. The ball rolls down a hill with a constant acceleration of 1.6 m/s^2. The ball reaches the bottom of the hill in 8.0 s. What is the ball's velocity at the bottom of the hill?

    a. 10 m/s
    b. 12 m/s
    c. 16 m/s
    d. 17 m/s

2. A cart is given an initial velocity of 5.0 m/s and experiences a constant acceleration of 2.0 m/s^2. What is the magnitude of the cart's displacement during the first 6.0 s of its motion?

    a. 10 m
    b. 55 m
    c. 66 m
    d. 80 m

3. A rock is thrown straight down with an initial velocity of 14.5 m/s from a cliff. What is the rock's displacement after 2.0 s? (Acceleration due to gravity is 9.80 m/s^2.)

    a. 28 m
    b. 49 m
    c. 55 m
    d. 64 m

4. A rock is thrown straight up with an initial velocity of 24.5 m/s.What maximum height will the rock reach before starting to fall downward? (Take acceleration due to gravity as 9.80 m/s^2.)

    a. 9.80 m
    b. 19.6 m
    c. 24.5 m
    d. 30.6 m

5. A rock is thrown straight up with an initial velocity of 19.6 m/s. What time interval elapses between the rock's being thrown and its return to the original launch point? (Acceleration due to gravity is 9.80 m/s^2.)

    a. 4.00 s
    b. 5.00 s
    c. 8.00 s
    d. 10.0 s

8. A bird, accelerating from rest at a constant rate, experiences a displacement of 28 m in 11 s. What is the average velocity?

    a. 1.7 m/s
    b. 2.5 m/s
    c. 3.4 m/s
    d. zero

10. A bird, accelerating from rest at a constant rate, experiences a displacement of 28 m in 11 s. What is its acceleration?

    a. 0.21 m/s^2
    b. 0.46 m/s^2
    c. 0.64 m/s^2
    d. 0.78 m/s^2

14. A European sports car dealer claims that his product will accelerate at a constant rate from rest to a speed of 100 km/hr in 8.00 s. What distance will the sports car travel during the 8-s acceleration period? (*Hint:* First convert speed to m/s.)

    a. 55.5 m
    b. 77.7 m
    c. 111 m
    d. 222 m

15. A European sports car dealer claims that his product will accelerate at a constant rate from rest to a speed of 100 km/hr in 8.00 s. What is the speed after the first 5.00 s of acceleration? (First convert the speed to m/s.)

    a. 34.7 m/s
    b. 44.4 m/s
    c. 28.7 m/s
    d. 17.4 m/s

18. Omar throws a rock down with speed 12 m/s from the top of a tower. The rock hits the ground after 2.0 s. What is the height of the tower? (air resistance is negligible)

    a. 20 m
    b. 24 m
    c. 44 m
    d. 63 m

19. Gwen releases a rock at rest from the top of a 40-m tower. If $g = 9.8\ m/s^2$ and air resistance is negligible, what is the speed of the rock as it hits the ground?

    a. 28 m/s

b. 30 m/s
c. 56 m/s
d. 784 m/s

20. John throws a rock down with speed 14 m/s from the top of a 30-m tower. If $g = 9.8$ m/s^2 and air resistance is negligible, what is the rock's speed just as it hits the ground?

a. 12 m/s
b. 28 m/s
c. 350 m/s
d. 784 m/s

21. A cheetah can run at approximately 100 km/hr and a gazelle at 80.0 km/hr. If both animals are running at full speed, with the gazelle 70.0 m ahead, how long before the cheetah catches its prey?

a. 12.6 s
b. 25.2 s
c. 6.30 s
d. 10.7 s

22. A cheetah can maintain its maximum speed of 100 km/hr for 30.0 seconds. What minimum distance must a gazelle running 80.0 km/hr be ahead of the cheetah to escape?

a. 100 m
b. 167 m
c. 70.0 m
d. 83.0 m

25. At the top of a cliff 100 m high, Raoul throws a rock upward with velocity 15.0 m/s. How much later should he drop a second rock from rest so both rocks arrive simultaneously at the bottom of the cliff?

a. 5.05 s
b. 3.76 s
c. 2.67 s
d. 1.78 s

27. An x vs. t graph is drawn for a ball moving in one direction. The graph starts at the origin and at $t = 5$ s the velocity of the ball is zero. We can be positive that at $t = 5$ s,

    a. the slope of the curve is non-zero.
    b. the ball has stopped.
    c. the acceleration is constant.
    d. the curve is at $x = 0$, $t = 0$.

28. A v vs. t graph is drawn for a ball moving in one direction. The graph starts at the origin and at $t = 5$ s the acceleration of the ball is zero. We know that at $t = 5$ s,

    a. the slope of the curve is non-zero.
    b. the velocity of the ball is not changing.
    c. the curve is not crossing the time axis.
    d. the curve is at $v = 0$, $t = 0$.

31. A railroad train travels forward along a straight track at 80.0 m/s for 1 000 m and then travels at 50.0 m/s for the next 1 000 m. What is the average velocity?

    a. 65.0 m/s
    b. 61.5 m/s
    c. 63.7 m/s
    d. 70.0 m/s

35. A 50-g ball traveling at 25.0 m/s is bounced off a brick wall and rebounds at 22.0 m/s. A high-speed camera records this event. If the ball is in contact with the wall for 3.50 ms, what is the average acceleration of the ball during this time interval?

    a. 13 400 m/s^2
    b. 6 720 m/s^2
    c. 857 m/s^2
    d. 20 m/s^2

39. A water rocket, launched from the ground, rises vertically with acceleration of 30 m/s^2 for 1.0 s when it runs out of "fuel." Disregarding air resistance, how high will the rocket rise?

    a. 15 m
    b. 31 m
    c. 61 m
    d. 120 m

40. A parachutist jumps out of an airplane and accelerates with gravity to a maximum velocity of 58.8 m/s in 6.00 seconds. She then pulls the parachute cord and after a 4.00-second constant deceleration, descends at 10.0 m/s for 60.0 seconds, reaching the ground. From what height did the parachutist jump?

    a. 914 m
    b. 1 130 m
    c. 1 520 m
    d. 1 750 m

43. A ball is thrown vertically upwards at 19.6 m/s. For its complete trip (up and back down to the starting position), its average velocity is

    a. 19.6 m/s
    b. 9.80 m/s
    c. 4.90 m/s
    d. not given

44. A ball is thrown vertically upwards at 19.6 m/s. For its complete trip (up and back down to the starting position), its average speed is

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    c. 4.90 m/s
    d. not given

45. If the displacement of an object is given in SI units by $\Delta x = -3\ t + 4\ t^2$, at $t = 2$ s its velocity and acceleration are, respectively

    a. positive, positive
    b. positive, negative
    c. negative, negative
    d. negative, positive

CHAPTER 2 - ANSWERS

#	Ans	Difficulty	#	Ans	Difficulty
1.	D	1	25.	D	3

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