CHAPTER 4

1. A 7.0-kg bowling ball experiences a net force of 5.0 N. What will be its acceleration?

a. 35 m/s^2 b. 7.0 m/s^2 c. 5.0 m/s^2 d. 0.71 m/s^2

5. Two ropes are attached to a 40-kg object. The first rope applies a force of 25 N and the second, 40 N. If the two ropes are perpendicular to each other, what is the resultant acceleration of the object?

a. 1.2 m/s^2 b. 3.0 m/s^2 c. 25 m/s^2 d. 47 m/s^2

6. Acceleration due to gravity on the Moon's surface is 1/6th that on Earth. An astronaut's life

support backpack weighs 300 lb on Earth. What does it weigh on the Moon?

- a. 1 800 lb b. 300 lb c. 135 lb d. 50 lb
- 9. If we know that a nonzero net force is acting on an object, which of the following must we assume regarding the object's condition? The object is:
 - a. at rest.
 - b. moving with a constant velocity.
 - c. being accelerated.
 - d. losing mass.
- 10. If we know an object is moving at constant velocity, we may assume:
 - a. The net force acting on the object is zero.
 - b. There are no forces acting on the object.
 - c. The object is accelerating.
 - d. The object is losing mass.

- 13. A 2 000-kg sailboat experiences an eastward force of 3 000 N by the ocean tide and a wind force against its sails with magnitude of 6 000 N directed toward the northwest (45° N of W). What is the magnitude of the resultant acceleration?
 - a. 2.2 m/s² b. 2.1 m/s² c. 1.5 m/s² d. 3.0 m/s²
- 15. A cart of weight 20 N is accelerated across a level surface at 0.15 m/s². What net force acts on the wagon? ($g = 9.8 \text{ m/s}^2$)
 - a. 0.92 N b. 0.31 N c. 3.0 N d. 4.5 N
- 17. Two blocks of masses 20 kg and 8 kg are connected together by a light string and rest on a frictionless level surface. Attached to the 8-kg mass is another light string, which a person uses to pull both blocks horizontally. If the two-block system accelerates at 0.5 m/s², then what is the tension in the connecting string between the blocks?
 - a. 14 N b. 6 N c. 10 N d. 4.0 N
- 20. A 15-kg block rests on a level frictionless surface and is attached by a light string to a 5.0-kg hanging mass where the string passes over a massless frictionless pulley. If $g = 9.8 \text{ m/s}^2$, what is the tension in the connecting string?
 - a. 65 N b. 17 N c. 49 N d. 37 N

- 21. A horizontal force of 750 N is needed to overcome the force of static friction between a level floor and a 250-kg crate. If $g = 9.8 \text{ m/s}^2$, what is the coefficient of static friction?
 - a. 3.0 b. 0.15 c. 0.28 d. 0.31
- 24. A 300-kg crate is placed on an adjustable inclined plane. As one end of the incline is raised, the crate begins to move downward. If the crate slides down the plane with an acceleration of 0.70 m/s^2 when the incline angle is 25°, what is the coefficient of kinetic friction between ramp and crate? ($g = 9.8 \text{ m/s}^2$)
 - a. 0.47 b. 0.42 c. 0.39 d. 0.12
- 26. A rock is rolled in the sand. It starts at 5.0 m/s, moves in a straight line for a distance of 3.0 m, and then stops. What is the magnitude of the average acceleration?
 - a. 1.8 m/s² b. 4.2 m/s² c. 5.4 m/s² d. 6.2 m/s²
- 27. Doug hits a hockey puck, giving it an initial velocity of 6.0 m/s. If the coefficient of kinetic friction between ice and puck is 0.050, how far will the puck slide before stopping?
 - a. 19 m b. 25 m c. 37 m d. 57 m
- 34. A boxcar of mass 200 tons at rest becomes uncoupled on a 2.5° grade. If the track is considered to be frictionless, what speed does the boxcar have after 10 seconds?
 - a. 0.37 m/s b. 0.59 m/s c. 1.3 m/s d. 4.3 m/s

- 35. As a car goes up a hill, there is a force of friction between the road and the tires rolling on the road. The maximum force of friction is equal to:
 - a. the weight of the car times the coefficient of kinetic friction.
 - b. the normal force of the road times the coefficient of kinetic friction.
 - c. the normal force of the road times the coefficient of static friction.
 - d. zero.
- 42. A man pulls a sled at a constant velocity across a horizontal snow surface. If a force of 80 N is being applied to the sled rope at an angle of 53° to the ground, what is the force of friction between sled and snow?
 - a. 80 N b. 64 N c. 48 N d. 40 N
- 45. A 15-N crate rests on an ramp; the maximum angle just before it slips is 25° with the horizontal. What is the coefficient of static friction between crate and ramp surfaces?
 - a. 0.11 b. 0.21 c. 0.38
- 47. A 5 000-N weight is suspended in equilibrium by two cables. Cable 1 applies a horizontal force to the right of the object and has a tension, T_1 . Cable 2 applies a force upward and to the left at an angle of 37.0° to the negative x axis and has a tension, T_2 . Find T_2 .
 - a. 4 000 N b. 6 640 N c. 8 310 N d. 3 340 N
- 52. A 500-N tightrope walker stands at the center of the rope such that each half of the rope makes an angle of 10.0° with the horizontal. What is the tension in the rope?
 - a. 1 440 N b. 1 000 N c. 500 N d. 2 900 N
- 53. A 500-N tightrope walker stands at the center of the rope. If the rope can withstand a tension of 1 800 N without breaking, what is the minimum angle the rope can make with the horizontal?

a. 4°

- b. 8°
 c. 10°
 d. 15°
- 59. A karate master strikes a board with an initial velocity of 10.0 m/s, decreasing to 1.0 m/s as his hand passes through the board. If the time of contact with the board is 0.002 0 s, and the mass of the coordinated hand and arm is 1.0 kg, what is the force exerted on the board?
 - a. 1 000 N b. 1 800 N c. 2 700 N d. 4 500 N
- 63. An automobile of mass 2 000 kg moving at 30 m/s is braked suddenly with a constant braking force of 10 000 N. How far does the car travel before stopping?
 - a. 45 m b. 90 m c. 135 m d. 180 m
- 65. A baseball batter hits an incoming 40-m/s fastball. The ball leaves the bat at 50 m/s after a ball-on-bat contact time of 0.030 s. What is the force exerted on the 0.15-kg baseball?
 - a. 450 N b. 250 N c. 90 N d. 50 N

- 70. A 9.0-kg hanging weight is connected by a string over a pulley to a 5.0-kg block sliding on a flat table. If the coefficient of sliding friction is 0.20, find the tension in the string.
 - a. 19 N b. 24 N c. 32 N d. 38 N



75. The maximum possible value for the coefficient of static friction is

- a. 0.50.
- b. 1.00.
- c. a value up to but not quite 1.00.
- d. greater than 1.00.

CHAPTER 4 - ANSWERS

#	Ans	Difficulty	#	Ans	Difficulty
1.	D	1	39.	В	2
2.	А	1	40.	А	3
3.	D	1	41.	А	3
4.	С	1	42.	С	2
5.	А	2	43.	D	2
6.	D	1	44.	А	2
7.	С	2	45.	D	2
8.	С	2	46.	В	3
9.	С	1	47.	С	3
10.	А	1	48.	D	2
11.	С	1	49.	А	2
12.	В	1	50.	В	3
13.	А	2	51.	D	3
14.	D	2	52.	А	2
15.	В	2	53.	В	2
16.	А	2	54.	С	2
17.	С	2	55.	D	2
18.	А	2	56.	А	2
19.	В	3	57.	А	2
20.	D	3	58.	С	2
21.	D	2	59.	D	3
22.	А	3	60.	В	2
23.	В	2	61.	С	2
24.	С	3	62.	В	2

25.	В	3	63	B. B	2
26.	В	2	64	4. B	2
27.	С	2	65	5. A	2
28.	С	2	66	5. B	2
29.	D	2	67	7. B	3
30.	С	1	68	B. B	2
31.	В	1	69	О. C	2
32.	Α	2	70). D	3
33.	D	2	71	. C	2
34.	D	2	72	2. C	3
35.	С	2	73	B. B	2
36.	D	1	74	L. C	1
37.	С	2	75	5. D	2
38.	В	2	76	6. B	3