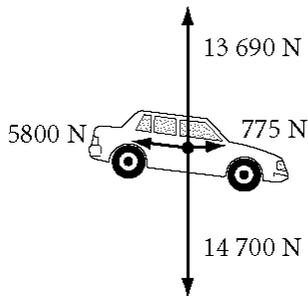


Q1W4-H.W- Forces and Laws of Motion

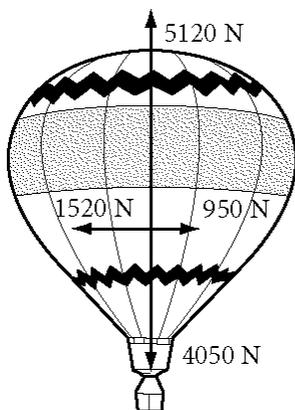
Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. Which of the following is the cause of an acceleration?
a. speed
b. inertia
c. force
d. velocity
- ___ 2. Which of the following statements does *not* describe force?
a. Force causes objects at rest to remain stationary.
b. Force causes objects to start moving.
c. Force causes objects to stop moving.
d. Force causes objects to change direction.
- ___ 3. What causes a moving object to change direction?
a. acceleration
b. velocity
c. inertia
d. force
- ___ 4. A newton is equivalent to which of the following quantities?
a. kg
b. $\text{kg}\cdot\text{m/s}$
c. $\text{kg}\cdot\text{m/s}^2$
d. $\text{kg}\cdot(\text{m/s})^2$
- ___ 5. The length of a force vector represents the
a. cause of the force.
b. direction of the force.
c. magnitude of the force.
d. type of force.
- ___ 6. A free-body diagram represents all of the following *except*
a. the object.
b. forces as vectors.
c. forces exerted by the object.
d. forces exerted on the object.



- ___ 7. The free-body diagram shown above represents a car being pulled by a towing cable. In the diagram, which of the following is the gravitational force acting on the car?
a. 5800 N
b. 775 N
c. 14 700 N
d. 13 690 N
- ___ 8. The free-body diagram shown above represents a car being pulled by a towing cable. In the diagram, the 5800 N force is
a. the gravitational force acting on the car.
b. the backward force the road exerts on the car.
c. the upward force the road exerts on the car.
d. the force exerted by the towing cable on the car.



- ___ 9. In the free-body diagram shown above, which of the following is the gravitational force acting on the balloon?
- 1520 N
 - 950 N
 - 4050 N
 - 5120 N
- ___ 10. A crate is released on a frictionless plank inclined at angle θ with respect to the horizontal. Which of the following relationships is true? (Assume that the x -axis is parallel to the surface of the incline.)
- $F_y = F_g$
 - $F_x = 0$
 - $F_y = F_x$
 - none of the above
- ___ 11. A late traveler rushes to catch a plane, pulling a suitcase with a force directed 30.0° above the horizontal. If the horizontal component of the force on the suitcase is 60.6 N, what is the force exerted on the handle?
- 53.0 N
 - 70.0 N
 - 65.2 N
 - 95.6 N
- ___ 12. A waitperson carrying a tray with a platter on it tips the tray at an angle of 12° below the horizontal. If the gravitational force on the platter is 5.0 N, what is the magnitude of the force parallel to the tray that tends to cause the platter to slide down the tray? (Disregard friction.)
- 0.42 N
 - 1.0 N
 - 4.9 N
 - 5.0 N
- ___ 13. A car goes forward along a level road at constant velocity. The additional force needed to bring the car into equilibrium is
- greater than the normal force times the coefficient of static friction.
 - equal to the normal force times the coefficient of static friction.
 - the normal force times the coefficient of kinetic friction.
 - zero.
- ___ 14. A single force acts on an object. The components of this force act along the $+x$ -axis and the $-y$ -axis. The single force that will bring the object into equilibrium has components that act along the
- $+x$ -axis and $+y$ -axis.
 - $+x$ -axis and $-y$ -axis.
 - $-x$ -axis and $+y$ -axis.
 - $-x$ -axis and $-y$ -axis.
- ___ 15. As an object falls toward Earth,
- the object does not exert a force on Earth.
 - the object exerts a downward force on Earth.
 - Newton's third law does not apply.
 - the upward acceleration of Earth is negligible because of its large mass.

- _____ 16. A sculpture is suspended in equilibrium by two cables, one from a wall and the other from the ceiling of a museum gallery. Cable 1 applies a horizontal force to the right of the sculpture and has a tension, F_{T1} . 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, F_{T2} . The gravitational force on the sculpture is 5.00×10^3 N. What is F_{T2} ?
- a. 4440 N
b. 6640 N
c. 8310 N
d. 3340 N
- _____ 17. If a nonzero net force is acting on an object, then the object is definitely
- a. at rest.
b. moving with a constant velocity.
c. being accelerated.
d. losing mass.
- _____ 18. Which statement about the acceleration of an object is correct?
- a. The acceleration of an object is directly proportional to the net external force acting on the object and inversely proportional to the mass of the object.
b. The acceleration of an object is directly proportional to the net external force acting on the object and directly proportional to the mass of the object.
c. The acceleration of an object is inversely proportional to the net external force acting on the object and inversely proportional to the mass of the object.
d. The acceleration of an object is inversely proportional to the net external force acting on the object and directly proportional to the mass of the object.
- _____ 19. In general, \mathbf{F}_{net} equals
- a. \mathbf{F}_f .
b. \mathbf{F}_g .
c. \mathbf{F}_n .
d. $\Sigma \mathbf{F}$.
- _____ 20. According to Newton's second law, when the same force is applied to two objects of different masses,
- a. the object with greater mass will experience a great acceleration, and the object with less mass will experience an even greater acceleration.
b. the object with greater mass will experience a smaller acceleration, and the object with less mass will experience a greater acceleration.
c. the object with greater mass will experience a greater acceleration, and the object with less mass will experience a smaller acceleration.
d. the object with greater mass will experience a small acceleration, and the object with less mass will experience an even smaller acceleration.
- _____ 21. A net force of 6.8 N accelerates a 31 kg scooter across a level parking lot. What is the magnitude of the scooter's acceleration?
- a. 0.22 m/s^2
b. 0.69 m/s^2
c. 3.2 m/s^2
d. 4.6 m/s^2
- _____ 22. A sled traveling at a speed of 3.0 m/s slows to a stop 4.0 m from the point where its passenger rolled off. What is the magnitude of the horizontal net force that slows the 110 N sled? (Assume $a_g = 9.81 \text{ m/s}^2$.)
- a. 130 N
b. 34 N
c. 37 N
d. 13 N
- _____ 23. Two perpendicular forces, one of 45.0 N directed upward and the other of 60.0 N directed to the right, act simultaneously on an object with a mass of 35.0 kg. What is the magnitude of the resultant acceleration of the object?
- a. 2.14 m/s^2
b. 3.00 m/s^2
c. 5.25 m/s^2
d. 1.41 m/s^2
- _____ 24. The statement by Newton that for every action there is an equal but opposite reaction is which of his laws of motion?
- a. first
c. third

D- 39 N

44. A trapeze artist on a rope is momentarily held to one side by a partner on a platform. The rope makes an angle of 26.0° with the vertical. In such a condition of static equilibrium, what is the magnitude of the horizontal force being applied by the partner? The weight of the artist is 7.61×10^2 N.

A- 1.71×10^2 N

B- 2.71×10^2 N

C- 3.71×10^2 N

D- 4.71×10^2 N

45. A wagon having a mass of 91 kg is accelerated across a level road at 0.97 m/s^2 . What net force acts on the wagon horizontally?

A- 68 N

B- 78 N

C- 88 N

D- 98 N

46. A sailboat with a mass of 2.1×10^3 kg experiences an ocean current force of 3.45×10^3 N directed to the east and a wind force against its sails with a magnitude of 6.53×10^3 N directed toward the northwest (45.0° N of W). What is the magnitude of the resultant acceleration of the boat?

A- 1.3 m/s^2

B- 1.8 m/s^2

C- 2.0 m/s^2

D- 2.3 m/s^2

47. Basking in the sun, a 1.97 kg lizard lies on a flat rock tilted at an angle of 15.9° with respect to the horizontal. What is the magnitude of the normal force exerted by the rock on the lizard?

A- 18.6 N

B- 19.6 N

C- 20.6 N

D- 21.6 N

48. A three-tiered birthday cake rests on a table. From bottom to top, the cake tiers weigh 15 N, 8 N, and 6 N, respectively. What is the magnitude and direction of the normal force acting on the base of the second tier?

A- 10 N, upward

B- 14 N, upward

C- 18 N, upward

D- 22 N, upward

49. A waitperson pushes the bottom of a glass tumbler full of water across a tabletop at constant speed. The tumbler and its contents have a mass of 0.86 kg, and the coefficient of kinetic friction for the surfaces in contact is 0.46. What force does the waitperson exert on the glass? ($g = 9.81 \text{ m/s}^2$)

A- 1.9 N

B- 2.9 N

C- 3.9 N

D- 4.9 N

50. A rope attached to an engine pulls a 240 N crate up an 14.7° ramp at constant speed. The coefficient of kinetic friction for the surfaces of the crate and ramp is 0.32. What is the magnitude of the force that the rope exerts on the crate parallel to the ramp? ($g = 9.81 \text{ m/s}^2$)

A- 135 N

B- 185 N

C- 235 N

D- 285 N

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