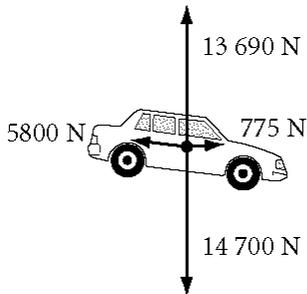


Q1W4-Test 1- Forces and Laws of Motion

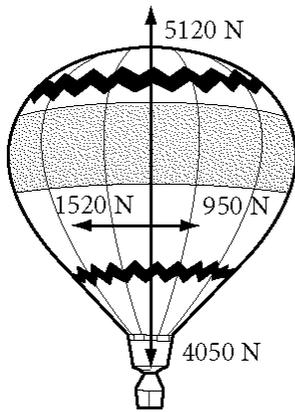
Multiple Choice

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?
- | | |
|-----------|-----------|
| a. 1520 N | c. 4050 N |
| b. 950 N | d. 5120 N |
- ___ 10. 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?
- | | |
|-----------|-----------|
| a. 53.0 N | c. 65.2 N |
| b. 70.0 N | d. 95.6 N |
- ___ 11. A waitress 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.)
- | | |
|-----------|----------|
| a. 0.42 N | c. 4.9 N |
| b. 1.0 N | d. 5.0 N |
- ___ 12. 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.
- ___ 13. 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 | c. 8310 N |
| b. 6640 N | d. 3340 N |
- ___ 14. Which statement about the acceleration of an object is correct?
- 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.
 - 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.
 - 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.
 - 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.

- ___ 15. In general, F_{net} equals
- F_f
 - F_g
 - F_n
 - ΣF
- ___ 16. According to Newton's second law, when the same force is applied to two objects of different masses,
- the object with greater mass will experience a great acceleration, and the object with less mass will experience an even greater acceleration.
 - the object with greater mass will experience a smaller acceleration, and the object with less mass will experience a greater acceleration.
 - the object with greater mass will experience a greater acceleration, and the object with less mass will experience a smaller acceleration.
 - the object with greater mass will experience a small acceleration, and the object with less mass will experience an even smaller acceleration.
- ___ 17. 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?
- 0.22 m/s^2
 - 0.69 m/s^2
 - 3.2 m/s^2
 - 4.6 m/s^2
- ___ 18. 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?
- 2.14 m/s^2
 - 3.00 m/s^2
 - 5.25 m/s^2
 - 1.41 m/s^2
- ___ 19. The statement by Newton that for every action there is an equal but opposite reaction is which of his laws of motion?
- first
 - second
 - third
 - fourth
- ___ 20. Which are simultaneous equal but opposite forces resulting from the interaction of two objects?
- net external forces
 - field forces
 - gravitational forces
 - action-reaction pairs
- ___ 21. Newton's third law of motion involves the interactions of
- one object and one force.
 - one object and two forces.
 - two object and one force.
 - two objects and two forces.
- ___ 22. A hockey stick hits a puck on the ice. Identify an action-reaction pair in this situation.
- The stick exerts a force on the puck; the puck exerts a force on the stick.
 - The stick exerts a force on the puck; the puck exerts a force on the ice.
 - The puck exerts a force on the stick; the stick exerts a force on the ice.
 - The stick exerts a force on the ice; the ice exerts a force on the puck.
- ___ 23. A ball is dropped from a person's hand and falls to Earth. Identify an action-reaction pair in this situation.
- The hand exerts a force on the ball; Earth exerts a force on the hand.
 - Earth exerts a force on the ball; the hand exerts a force on Earth.
 - Earth exerts a force on the hand; the hand exerts a force on the ball.
 - Earth exerts a force on the ball; the ball exerts a force on Earth.
- ___ 24. As a basketball player starts to jump for a rebound, the player begins to move upward faster and faster until his shoes leave the floor. At the moment the player begins to jump, the force of the floor on the shoes is
- greater than the player's weight.
 - equal in magnitude and opposite in direction to the player's weight.
 - less than the player's weight.
 - zero.

- ___ 25. A measure of the quantity of matter is
 a. density. c. force.
 b. weight. d. mass.
- ___ 26. A change in the gravitational force acting on an object will affect the object's
 a. mass. c. weight.
 b. coefficient of static friction. d. inertia.
- ___ 27. A sled weighing 1.0×10^2 N is held in place on a frictionless 20.0° slope by a rope attached to a stake at the top. The rope is parallel to the slope. What is the normal force of the slope acting on the sled?
 a. 94 N c. 37 N
 b. 47 N d. 34 N
- ___ 28. A book with a mass of 2.0 kg is held in equilibrium on a board with a slope of 60.0° by a horizontal force. What is the normal force exerted on the book?
 a. 39 N c. 15 N
 b. 61 N d. 34 N
- ___ 29. What are the units of the coefficient of friction?
 a. N c. N^2
 b. $1/\text{N}$ d. The coefficient of friction has no units.
- ___ 30. A crate is carried in a pickup truck traveling horizontally at 15.0 m/s. The truck applies the brakes for a distance of 28.7 m while stopping with uniform acceleration. What is the coefficient of static friction between the crate and the truck bed if the crate does not slide?
 a. 0.400 c. 0.892
 b. 0.365 d. 0.656

Problem

31. In a game of tug-of-war, a rope is pulled by a force of 182 N to the right and by a force of 108 N to the left. What is the magnitude and direction of the net horizontal force on the rope?
- A- 54 N, to the right
 B- 64 N, to the right
 C- 74 N, to the right
 D- 84 N, to the right
32. A sled is pulled at a constant velocity across a horizontal snow surface. If a force of 4.0×10^1 N is being applied to the sled rope at an angle of 11° to the ground, what is the magnitude of the force of friction of the snow acting on the sled?
- A- 29 N
 B- 39 N
 C- 49 N
 D- 59 N
33. 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- 28.6 N
 C- 38.6 N
 D- 48.6 N

34. 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- 8 N, upward
- B- 10 N, upward
- C- 12 N, upward
- D- 14 N, upward

35. 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- 145 N
- C- 155 N
- D- 165 N

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