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Pretest: Forces and Motion

Read each question. Circle the letter of the correct answer.

1. Which of the following is an action exerted on an object that may change the object's state of rest or motion?

A. mass

B. force

C. velocity

D. acceleration

2. Which of these units is the standard international unit of force?

A. gram

B. pound

C. newton

D. kilogram

3. A moving car backs into a parked car in a parking lot. Why would the bumpers on both cars be dented?

A. The parked car was made of weaker material than the car that was moving.

B. The car that was moving was made of weaker material than the parked car.

C. When one car bumps into the other car, they collide with equal and opposite force.

D. The bumpers of both cars would not have become dented as a result of this minor collision.

4. The same force is applied separately to two objects, A and B. B has twice the mass of A. What happens?

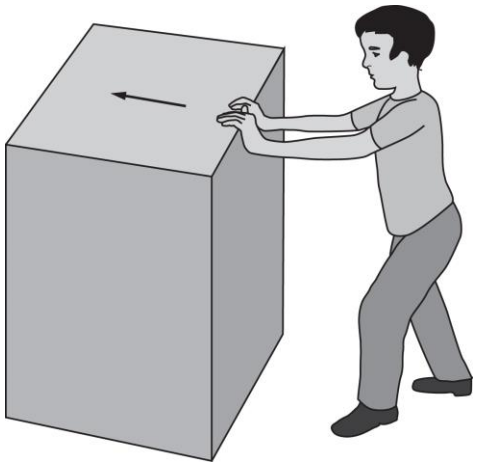
A. B's acceleration is half that of A.

B. B's acceleration is twice that of A.

C. B's acceleration is one-fourth that of A.

D. B's acceleration is four times that of A.

5. Which of these forces is being applied by the boy shown here?



A. gravitational force

B. fundamental force

C. contact force

D. field force

6. A metal ball sits motionless on a flat surface. Which of these would make the ball move?

A. The force of gravity becomes less.

B. The force of gravity becomes greater.

C. Two equal horizontal opposing forces act upon the ball.

D. Two unequal horizontal opposing forces act upon the ball.

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7. There are four objects: A, B, C, and D. The distance between any two objects is the same.

Their masses are:

A = 2B

B = 1/4C

D = 3/4C

Which of the diagrams correctly ranks the interactions between these objects, in terms of their gravitational attractive forces, from strongest to weakest?

A. A−B, B−C, C−D, D−A

B. C−D, D−A, A−B, B−D

C. B−C, C−D, D−A, A−B

D. C−D, D−A, A−B, B−C

8. An index card is placed across the top of a drinking glass. A coin is then placed on top of the index card. A student quickly flicks the card sideways off the glass. Which of these explains why the coin falls into the glass rather than moving to the side with the index card?

A. Newton's first law of motion

B. Newton's second law of motion

C. Newton's third law of motion

D. Newton's law of universal gravitation

9. The picture shows an object resting on a balance.

The weight of an object is given by $F = mg$, where $g = 9.8$ m/s^2. With what force does the object push down on the balance?

A. 9.3 kg·m/s^2 **C.** 4.90 kg·m/s^2

B. 9.8 kg·m/s^2 **D.** 0.500 kg·m/s^2

10. Objects labeled A, B, and C all have the same distance from each other. The gravitational attraction between objects A and B is less than the attraction between objects B and C. The attraction between objects A and C is less than the attraction between the other two sets of objects. What is the relationship between the masses of objects A, B, and C?

A. The mass of object A equals the mass of object C.

B. The mass of object A equals the mass of object B.

C. The mass of A is less than C, which is less than B.

D. The mass of C is greater than B, which is greater than A.

11. What change could cause an apple hanging from a tree branch to fall?

A. loss of gravity

B. loss of a sideways force on the left

C. loss of a sideways force on the right

D. loss of the upwards force opposing gravity

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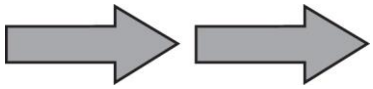
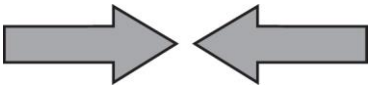
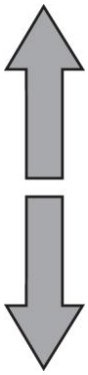
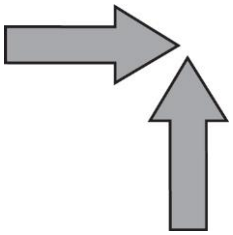
12. Which force diagram shows an unbalanced force that will result in a change in the direction of an object's motion?

A. 

B. 

C. 

D. 

13. Between which of these objects will the gravitational force be the smallest, if the objects are the same distance apart?

A. a marble and a baseball

B. a marble and a bowling ball

C. a baseball and a bowling ball

D. a bowling ball and a basketball

14. A skydiver jumps out of a plane. She falls downward at a very fast speed. When she opens her parachute, she slows down. What force pulled the skydiver to the ground?

A. friction

B. gravity

C. air resistance

D. parachute pull

15. A tennis ball hits a wall. Which of these statements is true?

A. The tennis ball's force is unopposed by the wall.

B. The tennis ball's speed doubles when it hits the wall.

C. The wall exerts a force in the same direction as the tennis ball's force.

D. The wall exerts a force in the opposite direction to the tennis ball's force.