Forces and Motion Test

1. **You have a hard time pushing the grocery cart which is now full of groceries. This is an example of which of Newton's Laws of Motion**?

   A. Newton's First Law **B.** Newton's Second Law **C.** Newton's Third Law **D.** All of these are correct

2. **Anna ran 100 meters in 20 seconds. What was her average speed?**

   A. 2 m/s **B.** 5 m/s **C.** 20 m/s **D.** 25 m/s

3. **Which statement best describes the motion of an object that is being subjected to two forces of equal size in opposite directions?**

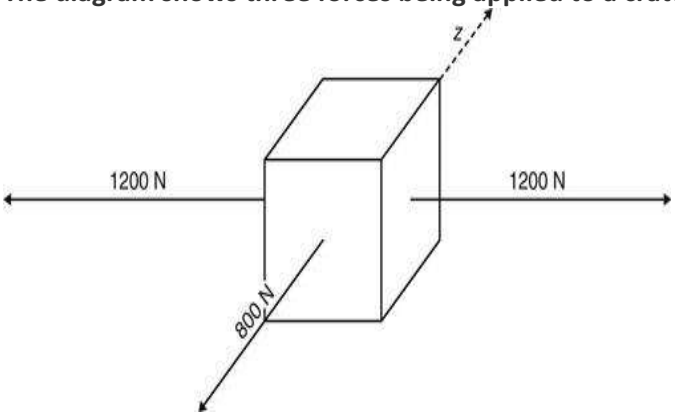
   A. The object is accelerating in the direction of the motion.

   B. The object is at rest or moving at a constant velocity.

   C. The object is accelerating at a rate that depends on the magnitude of the forces.

   D. The object starts from rest and then begins to move at a constant velocity.

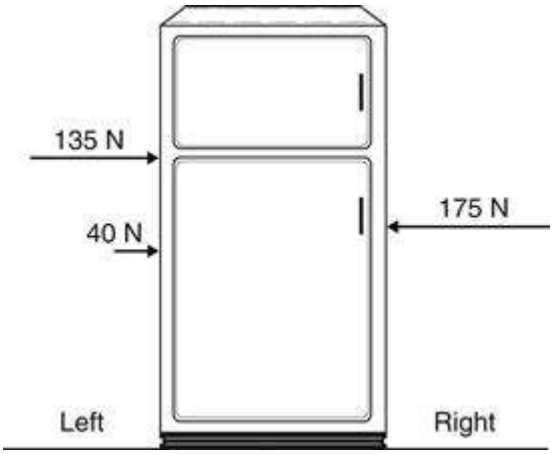
4. **The diagram shows three forces being applied to a crate on a floor.**



If the crate is to remain still, what amount of force must be applied for *z*?

A. 800 N **B.** 1200N **C.** 2000N **D.** 2400N

5. **To move a refrigerator, forces are applied as shown.**



Which of these statements best describes what will happen if the forces are applied at exactly the same time?

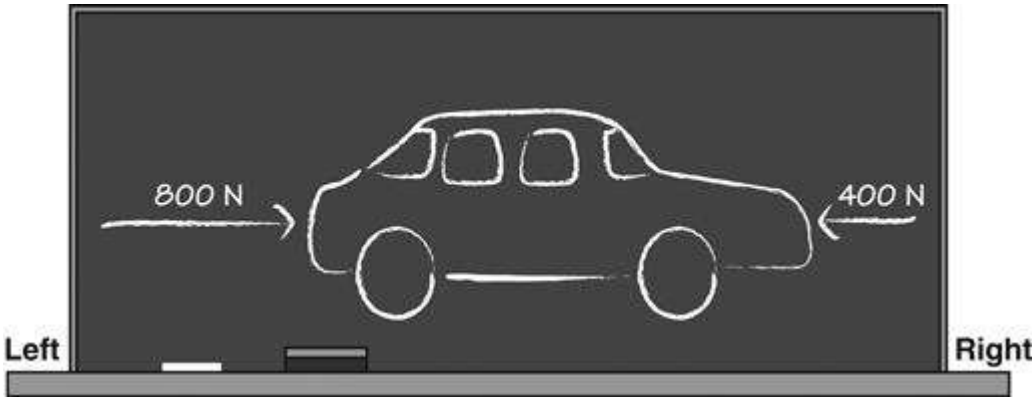
A. The refrigerator will move left, because of the greatest force on the right.

B. The refrigerator will move right, because the force is over a greater surface area.

C. The refrigerator will remain in place, because the forces are not enough to move a refrigerator.

D. The refrigerator will remain in the same place, because the net force is zero.

6. **A student draws a car with forces in 2 directions.**



Which statement would best describe the diagram?

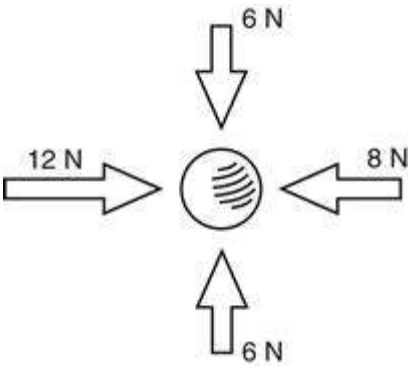
A. The forces of 800 N and 400 N should be multiplied to get the net force being applied to the car.

B. The applied forces of 800 N and 400 N will result in the car moving to the right.

C. The forces acting on the car are equal in size and the car will remain motionless.

D. The size of the forces acting on the car are the same but the directions are opposite.

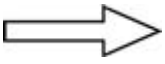
7. **The diagram shows forces acting on a ball at the same time.**



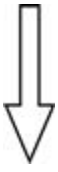
Which arrow best shows the direction that the ball will move?

A.

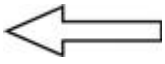
B.



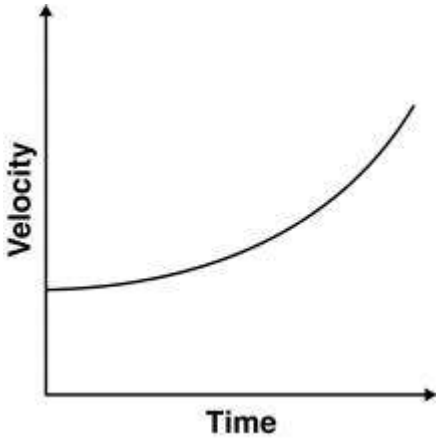
C.



D.



8. **This graph represents the motion of a cart traveling over a level surface.**



Which statement best describes the forces acting on the cart?

A. No net force is acting on the cart.

B. A constant net force is acting on the cart.

C. An increasing net force is acting on the cart.

D. A decreasing net force is acting on the cart.

9. **Newton's First Law of Motion is also known as _____.**

A. Law of Inertia. **B.** Law of Gravity. **C.** Law of Dynamics. **D.** Law of Conservation of Mass

10. **A teacher was discussing with the class that a bowling ball has more inertia than a basketball. Which physical property is most likely being compared?**

A. area **B.** mass **C.** color **D.** volume

11. **A student applies a 10 N force to a wood block with a mass of 5 kg. The block is pushed across four different surfaces. The accelerations of the block are recorded.**

Block Acceleration Data

Surface	Acceleration (in meters per second squared)
1 book	1.6
2 waxpaper	1.4
3 table top	1.8
4 sandpaper	1.3

Which can be concluded from the information in the table?

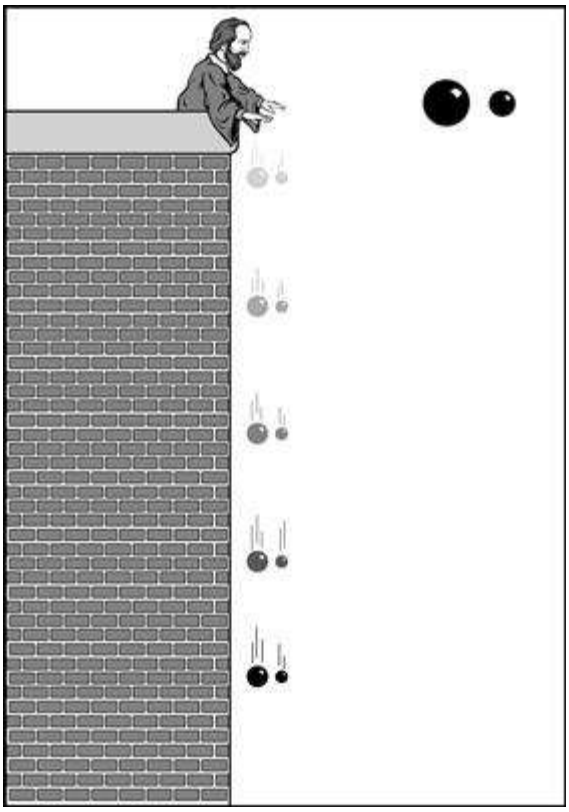
A. The block moved for the longest time over Surface 3.

B. The block showed the least friction on Surface 3.

C. The block had the greatest weight on Surface 4.

D. The block had the largest inertia on Surface 4.

12. **The picture shows an investigation conducted by Galileo many years ago. He learned that the speed of each ball increased as it fell, and that the balls fell at the same average speed.**



Which of these statements is best supported by Galileo's investigation?

A. Air resistance affects all objects equally.

B. Friction slows the acceleration of falling objects.

C. All falling objects accelerate toward Earth at the same rate.

D. Objects with greater mass exert more force than objects with less mass.

13. **When the roller coaster rolls onto a flat section of track, what force would ultimately bring it to a stop if no other forces ar**

A. gravity **B.** weight **C.** friction **D.** acceleration

14. **A jet plane is moving at a constant velocity on a flat surface. Which forces act against the forward motion of the plane?**

A. gravity and engine thrust

B. Acceleration and motion

C. Rolling friction and air resistance

D. air resistance and gravity

15. **During a collision, a seat belt slows the speed of a crash dummy. What is the direction of the net force exerted by the seat belt compared to the direction of the crash dummy's motion?**

A. in the same direction

B. in a vertical direction

C. in a downward direction

D. in the opposite direction

16. **An airplane flying at a constant speed and altitude suddenly loses engine power. Which force causes the airplane to move closer to Earth?**

A. wind **B.** engine thrust **C.** air pressure **D.** gravity

17. **Newton's first law of motion states that an object at rest will stay at rest unless acted upon by an outside force. Which activity is an example of this law?**

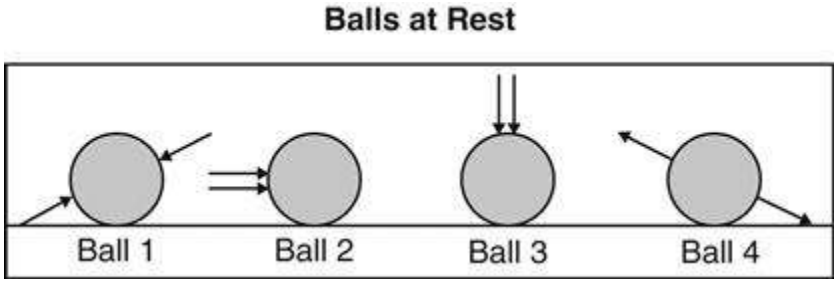
A. A football is kicked off a tee.

B. A baseball player slides into second base.

C. A floating stick is carried over a waterfall.

D. A bicycle travels faster as it goes downhill.

18. **The arrows in the diagram below represent equal forces acting on balls that are resting on a table.**



Which of the balls will be accelerated if the forces are applied?

A. Ball 1 **B.** Ball 2 **C.** Ball 3 **D.** Ball 4

19. **Two identical sheets of paper are used in an experiment; one is crumpled into a ball and the other is flat. What will most likely happen when they are dropped at the same time from the same height?**

A. flat sheet will fall on its edge

B. both will fall at the same rate

C. crumpled sheet will fall faster

D. crumpled sheet will move horizontally

20. **Which of the following examples is a demonstration of Newton's Third Law of Motion**

A. A ball comes to a stop.

B. A ball is at rest.

C. A rocket takes off and travels into space.

D. A rocket produces fire.

21. **Which of the following is the mathematical formula that best represents Newton's Second Law of Motion?**

A. F = M/A **B.** F = M x V **C.** M= F x A **D.** F= M x A

22. **You are in a car that comes to a stop unexpectedly. You keep moving forward until your seatbelt catches you. Which of Newton's Laws would best explain the example?**

A. Newton's First Law

B. Newton's Second Law

C. Newton's Third Law

D. Newton's Fourth Law

23. Velocity is different from speed because it also includes _____.

A. Mass **B.** volume **C.** direction **D.** distance

24. Which of the following is NOT a way that an object can accelerate?

A. Speed up **B.** slow down **C.** turn a corner **D.** constant speed

25. Resistance to change in motion increases when which of these increases?

A. temperature **B.** altitude **C.** speed and mass **D.** Newtons