Unit 5 Test: Force and Motion

Answers

1. _____ D
2. _____ F
3. _____ C
4. _____ J
5. _____ D
6. _____ J
7. _____ B
8. _____ F
9. _____ B
10. _____ G
11. _____ 12,650 (question was changed on original) Original answer was 1265
12. _____ H
13. _____ D
14. _____ H
15. _____ B
16. _____ G
17. _____ D
18. _____ J
19. _____ C
20. _____ F
1. A teacher points to a microscope sitting on the desk. Which conclusion best explains why the microscope is not moving?

   A. There are many forces acting on the microscope, but mostly it is its inertia that keeps it on the desk.
   B. Gravity is pulling on the microscope. It is only the weight of the scope that keeps it from moving off the desk.
   C. There is only one force, air pressure, acting on the microscope. The air in the room is pressing on the scope keeping it on the desk.
   D. There are two forces acting on the microscope. The desk is pushing up and gravity is pulling down. The balance of these forces keeps the microscope from moving.

2. When an object is acted on by unbalanced forces, the object will ALWAYS—

   F. accelerate
   G. continue in the same direction
   H. continue at the same speed
   J. come to a stop

3. A car traveled 500 m at 30 km/hr, then traveled 200 m at 40 km/hr. Which graph BEST illustrates the car's travels?

   A. 
   B. 
   C. 
   D. 

   [Graphs A, B, C, D are shown with axes labeled as Speed (km/hr) vs. Distance (m).]}
4. If a car is moving on a road at 70 km/hr going due north, and then changes direction and starts traveling north-east staying at 70 km/hr, what happens to its speed and velocity?

F. The speed of the car changes, but the velocity stays the same.
G. Both the speed and velocity of the car change.
H. Neither the speed nor the velocity of the car changes.
J. The velocity of the car changes, but the speed stays the same.

5. Joe pushes a box with a force of 16 N to the left. Ann pushes the same box from the opposite side with a force of 8 N to the right.

What will be the result?

A. It will move to the right with an 8 N force.
B. It will move to the right with a 2 N force.
C. It will move to the left with a 2 N force.
D. It will move to the left with an 8 N force.

6. The graph represents the movement of an object. Which description BEST fits the motion shown on the graph?

F. a roller coaster going down a big hill
G. a pitcher throwing a baseball
H. a rocket launch
J. a car traveling from one stop sign to the next
7. Martin gathered a toy car, a ramp, a stopwatch, a meter stick, and a variety of weights. What is he likely testing?

A. how the angle of a ramp affects the speed of the car  
B. how mass affects the speed of the car  
C. how friction affects the speed of the car  
D. how equal forces work on the placement of the car and the ramp

8. A 1000 kg rocket is moving forward at 10m/s in space. A 10,000 N force is applied to the rocket for one second from behind.

How fast is the rocket now traveling?

F. 20 m/s  
G. 15 m/s  
H. 10 m/s  
J. 0 m/s

9. A 2000 kg truck and a 500 kg car are racing. The same amount of force is applied to each of them. What will happen?

A. The truck will accelerate twice as fast.  
B. The car will accelerate four times as fast.  
C. The car will accelerate twice as fast.  
D. The truck will accelerate four times as fast.

10. One of the laws of motion states, "Things in motion stay in motion unless an unbalanced force acts upon it." On Earth, objects always seem to stop when more force is not being applied. What is causing the objects to stop?

F. the normal force  
G. friction  
H. weight  
J. gravity
11. Calculate the force needed to accelerate a 2,300 kg mass at 5.5 m/s/s acceleration.

Write the answer on your answer sheet and fill in the gridable.

12. Which answer choice illustrates your understanding of velocity?

   F. "It will take you about 2.5 hours to get to Shreveport, LA from Dallas, TX moving at an average speed of 63 mph."
   G. "Going to Dallas, TX from Shreveport, LA you can take Interstate 20W which is approximately 157 miles between the two cities."
   H. “If you travel at an average speed of 63 mph from Shreveport, LA and head west on Interstate 20, you'll arrive in Dallas, TX in about 2.5 hours.”
   J. None of the answer choices applies to velocity.

13. What is the acceleration of the car between 2 and 5 seconds?

   A. 30 m/s²  
   B. 15 m/s²  
   C. 5 m/s²  
   D. 0 m/s²

14. What is the average speed of the car after 3 seconds?

   F. 30 m/s  
   G. 15 m/s  
   H. 5 m/s  
   J. 3 m/s

Graph Use the following graph to answer the next two questions.

Distance a Car Travels

![Graph showing distance a car travels over time from 0 to 6 seconds.]

13. What is the acceleration of the car between 2 and 5 seconds?

A. 30 m/s²  
B. 15 m/s²  
C. 5 m/s²  
D. 0 m/s²

14. What is the average speed of the car after 3 seconds?

F. 30 m/s  
G. 15 m/s  
H. 5 m/s  
J. 3 m/s
In class, you have been discussing how force affects an object's acceleration. To show this, your teacher has asked you to design an experiment on how the angle of a ramp affects the speed of a car.

15. When designing the experiment, which of the following would be useful pieces of equipment?

   I. a one meter ramp
   II. a ten centimeter ramp
   III. a stopwatch
   IV. a meter stick
   V. photogate timer
   VI. toy car

A. II, III, V, and VI
B. I, IV, V, and VI
C. II, III, VI
D. I, VI

16. At which point on the track is the car accelerating?

   F. at Point A
   G. at Point B
   H. at Point C
   J. The car is not accelerating.

17. At which points is the velocity of the car the same?

   A. Points A and B
   B. Points A and C
   C. Points B and C
   D. The velocity is not the same at any of the points.
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Use the following Venn diagram to answer the next two questions.

18. Which of the following would be found in the *Velocity* part of the Venn diagram?
   
   F. shows how fast an object is going  
   G. shows change in speed  
   H. shows change in direction  
   J. shows the direction an object is going

19. Which of the following would be found in the part labeled X in the Venn diagram?

   A. shows the direction of an object  
   B. shows change in speed  
   C. shows how fast an object is going  
   D. shows change in direction
An experiment was conducted to see how the movement of a ball changes when it is dropped. The data from the experiment is listed below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 seconds</td>
<td>0 m/s</td>
</tr>
<tr>
<td>1 seconds</td>
<td>10 m/s</td>
</tr>
<tr>
<td>2 seconds</td>
<td>20 m/s</td>
</tr>
<tr>
<td>3 seconds</td>
<td>30 m/s</td>
</tr>
</tbody>
</table>

20. In the experiment above, which of the following stays the same throughout the experiment?

F. the acceleration of the ball  
G. the velocity of the ball  
H. the speed of the ball  
J. the velocity, speed, and acceleration all change