Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Newton's Laws Practice Quiz

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

1. After a cannonball is fired into frictionless space, the amount of force needed to keep it going equals
   a. zero, since no force is necessary to keep it moving.
   b. twice the force with which it was fired.
   c. one half the force with which it was fired.
   d. the same amount of force with which it was fired.
   e. one quarter the force with which it was fired.

2. Which has more mass, a kilogram of feathers or a kilogram of iron?
   a. The feathers
   b. The iron
   c. Neither—they both have the same mass.

3. A 10-kg brick and a 1-kg book are dropped in a vacuum. The force of gravity on the 10-kg brick is
   a. 10 times as much as the force on the 1-kg book.
   b. zero.
   c. the same as the force on the 1-kg book.

4. A player hits a ball with a bat. The action force is the impact of the bat against the ball. What is the reaction to this force?
   a. The force of the ball against the bat
   b. The weight of the ball
   c. Air resistance on the ball
   d. The grip of the player's hand against the bat
   e. none of the above

5. A person is attracted towards the center of Earth by a 440-N gravitational force. The force with which Earth is attracted toward the person is
   a. 440 N.
   b. very very small.
   c. very very large.

6. Friction is a force that always acts
   a. perpendicular to an object's motion.
   b. opposite to an object's motion.
   c. in the same direction as an object's motion.

7. The law of inertia applies to
   a. objects at rest.
   b. moving objects.
   c. both moving and nonmoving objects.

8. One object has twice as much mass as another object. The first object also has twice as much
   a. velocity.
   b. gravitational acceleration.
   c. inertia.
   d. all of the above

9. Compared to its weight on Earth, a 10-kg object on the moon will weigh
   a. the same amount.
   b. less.
   c. more.

10. How does acceleration of an object change in relation to its mass? It is
    a. directly proportional.
    b. Acceleration doesn't depend on mass at all.
    c. inversely proportional.

11. Suppose the force of friction on a sliding object is 25 N. The force needed to maintain a constant velocity is
    a. more than 25 N.
    b. 25 N
    c. less than 25 N.

12. A girl pulls on a 10-kg wagon with a constant force of 20 N. What is the wagon's acceleration?
    a. 0.5 m/s^2
    b. 2 m/s^2
    c. 10 m/s^2
    d. 20 m/s^2
    e. 200 m/s^2

13. A force of 3 N accelerates a mass of 3 kg at the rate of 1 m/s^2. The acceleration of a mass of 6 kg acted upon by a force of 6 N is
    a. twice as much.
    b. half as much.
    c. the same.
    d. none of the above

14. Suppose a cart is being moved by a force. If suddenly a load is dumped into the cart so that the cart's mass doubles, what happens to the cart's acceleration?
    a. It quarters.
    b. It halves.
    c. It stays the same.
    d. It doubles.
    e. It quadruples.

15. You pull horizontally on a 50-kg crate with a force of 450 N and the friction force on the crate is 250 N. The acceleration of the crate is
    a. 2 m/s^2.
    b. 4 m/s^2.
    c. 9 m/s^2.
    d. 14 m/s^2.

16. A high school student hits a nail with a hammer. During the collision, there is a force
    a. on the nail but not on the hammer.
    b. on the nail and also on the hammer.
    c. on the hammer but not on the nail.

17. According to Newton's third law, if you push gently on something, it will push
    a. gently on something else.
    b. on you only if you aren't moving.
    c. gently on you.
    d. on something only under the right conditions.

18. A box is dragged without acceleration in a straight-line path across a level surface by a force of 13 N. What is the frictional force between the box and the surface?
    a. 13 N
    b. Less than 13 N
    c. More than 13 N
    d. Need more information to say.

19. When the angle of an incline with a block resting on it increases, the normal support force
    a. increases.
    b. stays the same.
    c. decreases.

Problem

20. On the surface of Jupiter, the acceleration due to gravity is about 3 times that on Earth. How much would a 0.40-kg rock weigh on Jupiter?

21. On the surface of Jupiter, the acceleration due to gravity is about 3 times that of Earth. What would be the mass of a 170-kg rock on Jupiter?

22. A 400,000-kg airplane in takeoff uses the 40,000 N thrust of each one of its four engines. What is the acceleration of the plane during takeoff?

23. A 3 kg block is pulled across a table by a string with force of 40 N. The block experiences a friction force of 5 N. What is the acceleration of the block?

24. Howard is moving a 90 kg wooden crate from one side of his office to the other. To accomplish this, he ties a rope around his waist and begins to walk, so that the crate is dragged horizontally across the floor. If the coefficient of friction between the crate and the floor is 0.159, what force must Howard apply to to the rope to move at a constant speed?

25. A net force of 1.0 N acts on a 4.0-kg object, initially at rest, for 4.0 seconds. What is the distance the object moves during that time?

Newton's Laws Practice Quiz
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 DIF: L2 OBJ: 3.4 Newton's Law of Inertia
   STA: Ph.1.b | CA.IE.1k KEY: force | friction
   BLM: application
2. ANS: C PTS: 1 DIF: L2 OBJ: 3.5 Mass—A Measure of Inertia
   KEY: mass | kilogram BLM: comprehension
3. ANS: A PTS: 1 DIF: L2 OBJ: 6.6 Free Fall Explained
   STA: Ph.1.c KEY: gravity | vacuum BLM: application
4. ANS: A PTS: 1 DIF: L2 OBJ: 7.3 Identifying Action and Reaction
   STA: Ph.1.d KEY: action | force | reaction BLM: comprehension
5. ANS: A PTS: 1 DIF: L2 OBJ: 7.3 Identifying Action and Reaction
   STA: Ph.1.d KEY: gravity | force BLM: application
6. ANS: B PTS: 1 DIF: L1 OBJ: 3.3 Galileo on Motion
   STA: Ph.1.b | CA.IE.1k KEY: friction | force
   BLM: knowledge
7. ANS: C PTS: 1 DIF: L2 OBJ: 3.4 Newton's Law of Inertia
   STA: Ph.1.b | CA.IE.1k KEY: inertia | moving
   BLM: comprehension
8. ANS: C PTS: 1 DIF: L2 OBJ: 3.5 Mass—A Measure of Inertia
   KEY: mass | inertia BLM: application
9. ANS: B PTS: 1 DIF: L2 OBJ: 3.5 Mass—A Measure of Inertia
   KEY: weight | Earth BLM: comprehension
10. ANS: C PTS: 1 DIF: L1 OBJ: 6.2 Mass Resists Acceleration
    STA: Ph.1.c KEY: acceleration | mass BLM: knowledge
11. ANS: B PTS: 1 DIF: L2 OBJ: 6.4 Friction
    STA: Ph.1.c KEY: friction | force BLM: comprehension
12. ANS: B PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
    STA: Ph.1.c KEY: acceleration | force BLM: application
13. ANS: C PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
    STA: Ph.1.c KEY: acceleration | mass | force BLM: application
14. ANS: B PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
    STA: Ph.1.c KEY: force | mass BLM: application
15. ANS: B PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
    STA: Ph.1.c KEY: acceleration | friction BLM: application
16. ANS: B PTS: 1 DIF: L2 OBJ: 7.3 Identifying Action and Reaction
    STA: Ph.1.d KEY: force | collision BLM: comprehension
17. ANS: C PTS: 1 DIF: L2 OBJ: 7.2 Newton's Third Law
    KEY: Newton's third law | action BLM: comprehension
18. ANS: A PTS: 1 DIF: L2 OBJ: 6.4 Friction
    STA: Ph.1.c KEY: force | friction BLM: application

19. ANS: C PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
STA: Ph.1.c KEY: angle | support force BLM: application

PROBLEM

20. ANS:
12 N

PTS: 1 DIF: L2 OBJ: 3.5 Mass—A Measure of Inertia
KEY: gravity | weight BLM: application

21. ANS:
170 kg

PTS: 1 DIF: L2 OBJ: 3.5 Mass—A Measure of Inertia
KEY: gravity | weight BLM: application

22. ANS:
0.4 m/s^2

PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
STA: Ph.1.c KEY: thrust | acceleration BLM: application

23. ANS:
11.67 m/s2

PTS: 1

24. ANS:
143 N

PTS: 1

25. ANS:
2.0 m

PTS: 1 DIF: L2 OBJ: 6.3 Newton's Second Law
STA: Ph.1.c KEY: net force | distance BLM: application