

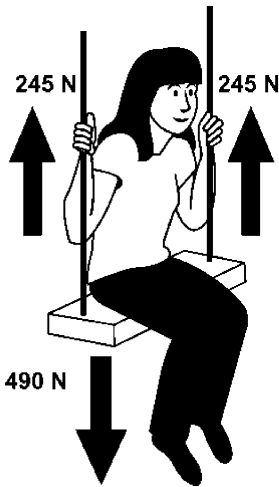
## Physics Unit 2 Review

### Multiple Choice

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

- The SI unit of force is the
  - joule.
  - kilogram.
  - meter.
  - newton.
- When an unbalanced force acts on an object,
  - the object's motion does not change.
  - the object accelerates.
  - the weight of the object decreases.
  - the inertia of the object increases.
- As you push a cereal box across a tabletop, the sliding friction acting on the cereal box
  - acts in the direction of motion.
  - equals the weight of the box.
  - is usually greater than static friction.
  - acts in the direction opposite of motion.
- The forces acting on a falling leaf are
  - air resistance and fluid friction.
  - gravity and air resistance.
  - gravity and static friction.
  - weight and rolling friction.
- An orange might roll off your cafeteria tray when you stop suddenly because of
  - the balanced forces acting on the orange.
  - the centripetal force acting on the orange.
  - the friction forces acting on the orange.
  - the orange's inertia.
- According to Newton's second law of motion, the acceleration of an object equals the net force acting on the object divided by the object's
  - mass.
  - momentum.
  - velocity.
  - weight.
- Your weight equals your
  - mass.
  - mass divided by the net force acting on you.
  - mass times the acceleration due to gravity.
  - mass times your speed.
- The product of an object's mass and velocity is its
  - centripetal force.
  - momentum.
  - net force.
  - weight.
- What is conserved when two objects collide in a closed system?
  - acceleration
  - momentum
  - speed
  - velocity
- What is the momentum of a 50-kilogram ice skater gliding across the ice at a speed of 5 m/s?
  - $10 \frac{\text{kg}}{\text{m/s}}$
  - 500 kg·m/s
  - 50 kg
  - 250 kg·m/s

11. A cart is rolling down a ramp. If the angle of the ramp is increased to make the ramp steeper, the cart will:
- accelerate slower.
  - accelerate at the same rate.
  - accelerate faster.
  - move at a constant velocity.
12. What is the mass of a rock that weighs 49 newtons?
- 1 kilogram
  - 2 kilograms
  - 5 kilograms
  - 10 kilograms
13. A tow truck pulls a 2,000-kilogram car with a net force of 4,000 newtons. What is the acceleration of the car?
- $0.5 \text{ m/sec}^2$
  - $2 \text{ m/sec}^2$
  - $200 \text{ m/sec}^2$
  - $2,000 \text{ m/sec}^2$
14. In the picture below, a girl is sitting motionless on a swing. What is the net force on the girl?



- 0 newtons
  - 245 newtons upwards
  - 490 newtons upwards
  - 490 newtons downwards
15. A 200-kilogram rocket accelerates at  $50 \text{ m/sec}^2$ . How large is the force required to cause an acceleration of this size?
- $1/4$  newton
  - 4 newtons
  - 1,000 newtons
  - 10,000 newtons

16. A car is traveling down a straight stretch of highway at 90 kilometers per hour. The driver suddenly slams on the brakes and brings the car to a quick stop. As a result, the unbelted passengers will at first:
  - a. continue to move forward in a straight line.
  - b. come to a stop at the same time as the car.
  - c. be pushed against the door on the passenger side.
  - d. be pushed against the back of the seat.
17. What is the approximate weight in newtons of a 7.0-kilogram bowling ball?
  - a. 7.0 newtons
  - b. 70 newtons
  - c. 700 newtons
  - d. 7000 newtons
18. A book rests on a table. The force of gravity pulls down on the book with a force of 20 newtons. What prevents the book from accelerating downward at  $9.8 \text{ m/sec}^2$ ?
  - a. The table presses back up on the book with an equal and opposite force of 20 newtons.
  - b. The table presses back up on the book with a force greater than 20 newtons.
  - c. The table and the book together are accelerating downwards at  $9.8 \text{ m/sec}^2$ .
  - d. The inertia of the book holds it up.
19. Newton's third law of motion involves:
  - a. one force acting on one object.
  - b. a force pair acting on two different objects.
  - c. a force pair acting on one object.
  - d. unbalanced forces acting on many objects.
20. What is the momentum of a 0.15-kilogram baseball moving at 20 m/sec?
  - a. 1.5 kg·m/sec
  - b. 3 kg·m/sec
  - c. 15 kg·m/sec
  - d. 30 kg·m/sec

### Matching

*Match the following terms with the correct definition. There is one extra term that will not match any of the definitions.*

- a. speed
  - b. mass
  - c. weight
  - d. inertia
  - e. friction
  - f. gravity
21. The tendency of an object to resist changing its state of motion
  22. Force that always works against the motion that produces it
  23. A measure of the pulling force of gravity
  24. A force that pulls every mass toward every other mass

25. The amount of matter in an object; it determines an object's inertia

**Essay**

26. Newton's third law is, perhaps, the most difficult to understand at first. It would seem that if two teams are pulling on the same rope and, according to Newton's 3rd law, are exerting equal forces (all forces come in pairs), then neither team would win in a tug-of-war. Yet, one team wins every time. And it is not because they pull harder on the rope when the other team tires. They cannot. Why is one team able to win? Explain your answer.

**Other**

27. Listed below are descriptions of the motion of several objects. If they are accelerating answer YES next to the description of the object. If they are not accelerating answer NO.
- \_\_\_\_\_ A car traveling on a turnpike at a 60 mph with its cruise control engaged
  - \_\_\_\_\_ A motorcycle whose brakes have been applied
  - \_\_\_\_\_ A baseball dropped from the roof of a building
  - \_\_\_\_\_ A girl on a skateboard going around a corner at a speed of 3 m/sec
  - \_\_\_\_\_ A tractor-trailer parked in a rest area
28. Listed below are daily life scenarios about objects in motion and at rest. Decide which of Newton's three laws of motion best applies to each situation, and answer *1st, 2nd, or 3rd* in each blank.
- \_\_\_\_\_ A boat moves through the water because of a rowing motion (using oars).
  - \_\_\_\_\_ Spin a raw egg on the table, stop it with your hand, and remove your hand quickly. The egg will begin to spin again with no help at all!
  - \_\_\_\_\_ A dropped basketball hits the floor and bounces back up.
  - \_\_\_\_\_ It takes more force to accelerate a loaded dump truck than it takes to accelerate a small car with one passenger.
  - \_\_\_\_\_ A cup of water sits motionless on a kitchen table.

**Physics Unit 2 Review  
Answer Section****MULTIPLE CHOICE**

1. D
2. B
3. D
4. B
5. D
6. A
7. C
8. B
9. B
10. D
11. C
12. C
13. B
14. A
15. D
16. A
17. B
18. A
19. B
20. B

**MATCHING**

21. D
22. E
23. C
24. F
25. B

**ESSAY**

26. Although both teams pull equally hard on the rope, as they pull on the rope they are ALSO pushing on the ground—and the ground pushes back. The reason the winners win lies in the fact that they push harder on the ground than the other team and the ground pushes back on them harder than the other team. They simply have to hold on while the ground pushes them into the winner's circle.

**OTHER**

- 27. a. NO
- b. YES
- c. YES
- d. YES
- e. NO
- 28. a. 3rd
- b. 1st
- c. 3rd
- d. 2nd
- e. 1st