practice mid-term

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

____ 1. A carefully designed test done under controlled conditions is called a(n):
a. natural law.
b. experiment.
c. common law.
d. analysis.

____ 2. The mass of an object is determined by:
a. finding the amount of matter it contains.
b. measuring its weight.
c. identifying the substance from which the object is made.
d. finding its dimensions.

____ 3. A factor that affects the behavior of a system is called a(n):
a. natural law.
b. experiment.
c. analysis.
d. variable.

____ 4. A variable that remains unchanged throughout an experiment is called the:
a. control variable.
b. experimental variable.
c. independent variable.
d. dependent variable.

____ 5. Of the following objects, the one which has the most mass is:
a. the Goodyear blimp.
b. a silver dollar.
c. a piece of notebook paper.
d. a physics textbook.

____ 6. Robin measures the force needed to pull a wagon up an incline as more weight is added. In this investigation, weight is the ____ variable.
a. control
b. dependent
c. independent
d. natural

____ 7. The unit of time used most commonly by physicists and other scientists is the:
a. second.
b. minute.
c. hour.
d. light year.

____ 8. The independent variable on a graph can be described as the variable:
a. represented on the *x*-axis.
b. causing the change in the experimental system.
c. over which a scientist has direct control when designing the experiment.
d. defined by all of the statements above.

____ 9. The conversion factor for changing one unit of length to another in the metric system is a multiple of:
   a. 3.
   b. 10.
   c. 12.
   d. 5,280.

____ 10. Because it is based on factors of 10 and is easy to work with, scientists prefer to use the ____ system.
   a. metric
   b. English
   c. scientific
   d. control

____ 11. Which of the lists show units arranged in order from smallest to largest?
   a. Millimeter, centimeter, kilometer, meter
   b. Centimeter, meter, kilometer, millimeter
   c. Millimeter, centimeter, meter, kilometer
   d. Meter, kilometer, millimeter, centimeter

____ 12. How many seconds are in a stopwatch showing 1 hour, 3 minutes, and 5 seconds?
   a. 68 seconds
   b. 245 seconds
   c. 3,785 seconds
   d. 10,805 seconds

____ 13. Orlando measures the brightness of a flashlight bulb as he adds more batteries to the circuit. If he prepares a graph of the data:
   a. the number of batteries should be represented on the *x*-axis.
   b. the brightness of the flashlight bulb should be represented on the *x*-axis.
   c. it doesn't matter which variable he places on the *x*-axis.
   d. he will need more information before deciding where to place the variables.

____ 14. On his way to a concert, John stops at the mall to buy some camera film. If you divide the distance he travels to the concert by his average speed for the entire trip, you are calculating:
   a. speed.
   b. distance.
   c. time interval.
   d. mixed units.

____ 15. If you know the distance traveled and the amount of time it took, speed may be calculated by:
   a. dividing time by distance.
   b. multiplying time by distance.
   c. dividing distance by time.
   d. multiplying distance squared by time.

____ 16. Of the following, which equation does NOT correctly represent a relationship between distance, time and speed?
   a. Distance equals speed multiplied by time.
   b. Speed equals time multiplied by distance.
   c. Time equals distance divided by speed.
   d. Speed equals distance divided by time.

____ 17. The speed of a cheetah running 300 yards in 10 seconds is:
   a. 30 yards per second.
   b. 3,000 yards per minute.
   c. 30,000 miles per hour.
   d. None of the above

____ 18. Doug rides a motorcycle at an average speed of 42 miles per hour for 3.6 hours. The distance he travels is about ____ miles.
a. 11
b. 38
c. 47
d. 150

____ 19. Gwennen rides her bicycle 2.4 kilometers up a steep hill in 8 minutes. Her speed is ____ kilometers per minute.
a. 0.3
b. 0.6
c. 3.3
d. 19

____ 20. A professional LPGA golfer walks at an average rate of 3.20 feet per second on the golf course. The amount of time required for her to walk from the tee to a green 612 feet away is:
a. 0.544 minutes.
b. 1.91 minutes.
c. 1,958 seconds.
d. 191 seconds.

____ 21. The inertia of an object is related to its:
a. mass and speed.
b. mass and force.
c. mass only.
d. speed only.

____ 22. Newton's first law is also known as the law of:
a. inertia.
b. universal gravitation.
c. force pairs.
d. unbalanced forces.

____ 23. If the net force acting on a moving object is zero, the object will:
a. slow down and, eventually, stop.
b. continue at the same speed but change direction.
c. continue in the same direction but change speed.
d. continue in the same direction with no change of speed.

____ 24. A ball with a mass of 1 kilogram is moving in a straight line at the same speed as a ball with a mass of 10 kilograms. Both balls are brought to rest in 4.0 seconds. What is true of the force required to stop the balls?
a. It takes less force to stop the 1 kilogram ball because it has less inertia.
b. It takes more force to stop the 1 kilogram ball because it has more inertia.
c. It takes the same force to stop both balls because they moving at the same speed.
d. It takes less force to stop the 10 kilogram ball because it has less inertia.

____ 25. If an object is accelerated, all of the following may occur EXCEPT:
a. a change of speed.
b. a change of direction.
c. it remains motionless.
d. a change of direction and speed.

____ 26. The newton is defined as the:
a. force of gravity acting on a one kilogram object at Earth's surface.
b. force that can give a 1-kilogram mass an acceleration of 1 m/sec^2.
c. speed of an object when under the influence of Earth's gravitational field.
d. mass of an object that is accelerated at a rate of 1 m/sec^2.

____ 27. All of the following examples of motion can be caused by a net force EXCEPT a:
   a. car moving around a corner at 30 miles per hour.
   b. boat speeding down a lake at 100 kilometers per hour.
   c. skateboarder rolling to a stop.
   d. motorcycle accelerating from 0 to 70 miles per hour in 4.2 seconds.

____ 28. The equation that correctly expresses Newton's second law is:
   a. force = mass ÷ acceleration.
   b. force = mass × acceleration.
   c. force = mass + acceleration.
   d. force = mass - acceleration.

____ 29. The term that best describes the motion of an object that is slowing down is:
   a. free fall.
   b. gravity.
   c. deceleration.
   d. uniform.

____ 30. Units of measurement used to label a quantity of acceleration are:
   a. cm^2/sec.
   b. sec^2/cm.
   c. cm/sec.
   d. cm/sec^2.

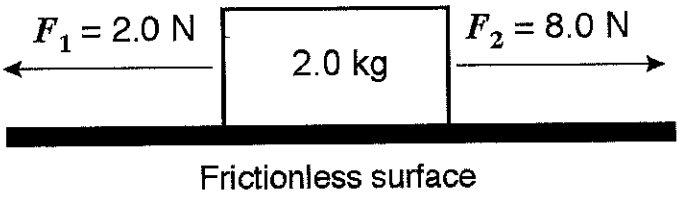
____ 31. The rate of change in the speed of an object is known as:
   a. velocity.
   b. displacement.
   c. acceleration.
   d. equilibrium.

____ 32. Acceleration of an object **must** be caused by a force that is:
   a. positive.
   b. zero.
   c. negative.
   d. not zero.

____ 33. The metric unit of force preferred by scientists is the:
   a. kilogram.
   b. newton.
   c. mima.
   d. pound.

____ 34. Toby glances at the speedometer on his bicycle as he begins to roll downhill. It indicates he is traveling at 12 miles per hour when he initially looks at it and 20 miles per hour 4 seconds later. His acceleration is:
   a. 2 mph/sec.
   b. 3 mph/sec.
   c. 5 mph/sec.
   d. 8 mph/sec.

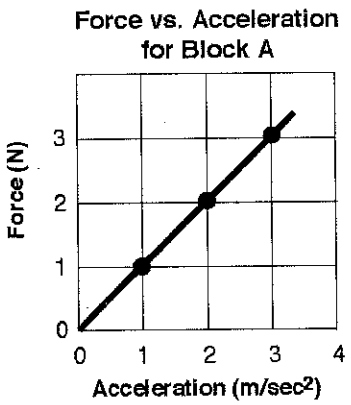
____ 35. Two forces are applied to a 2.0-kilogram block on a frictionless, horizontal surface, as shown in the following diagram:

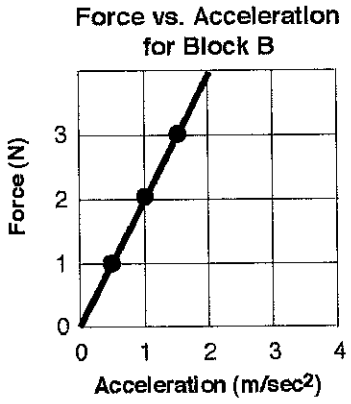


The acceleration of the block is:
a. 3.0 m/sec^2 to the right.
b. 3.0 m/sec^2 to the left.
c. 5.0 m/sec^2 to the right.
d. 5.0 m/sec^2 to the left.

____ 36. A series of forces was applied to each of two blocks, A and B. The graphs below show the relationship between the force and the acceleration for each block.

Compared to the mass of block A, the mass of block B is:





a. the same.
b. twice as great.
c. half as great.
d. four times as great.

____ 37. When an object is accelerating due to the force of gravity with no other forces acting on it, it is:
a. changing direction.
b. motionless.
c. in free fall.
d. at terminal speed.

____ 38. When you throw a ball up in the air, it travels up and then stops instantaneously before falling back down. At the point where it stops and changes direction to fall back down its:
a. acceleration is zero.
b. velocity is zero.
c. force is zero.
d. mass is zero.

____ 39. A ball is dropped off the roof of a tall building. If the ball reaches the ground in 3 seconds, how tall is the building?
a. 9.8 meters
b. 14.7 meters
c. 29.4 meters
d. 44.1 meters

____ 40. Terminal speed occurs when:
a. the air resistance of an object increases.
b. an object starts to slow down due to air resistance.
c. the force of gravity is balanced by the air resistance of an object.
d. the acceleration due to gravity equals zero.

____ 41. An object is dropped from rest and falls downward for 3 seconds. What is its average speed?
a. 1.6 m/sec
b. 9.8 m/sec
c. 14.7 m/sec
d. 29.4 m/sec

____ 42. A skydiver reaches an instantaneous velocity of 88.2 meters per second before opening his parachute. How long was he in free fall?
a. 4.5 seconds
b. 8 seconds
c. 9 seconds
d. 864 seconds

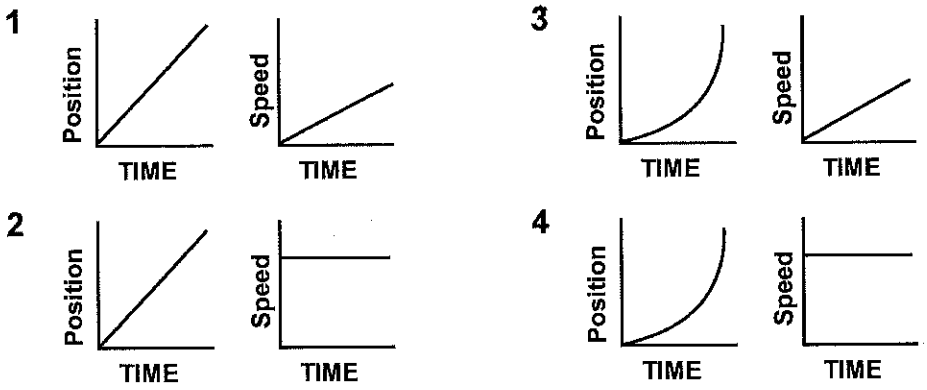
____ 43. The slope of a position versus time graph represents:
a. acceleration.
b. force.
c. position.
d. speed.

____ 44. If the *x*-axis of a graph has a value of zero, the area enclosed between the best-fit line and the horizontal axis of a speed versus time graph represents:
a. acceleration.
b. distance.
c. position.
d. speed.

____ 45. The slope of a speed versus time graph represents:
a. acceleration.
b. distance.
c. force.
d. velocity.

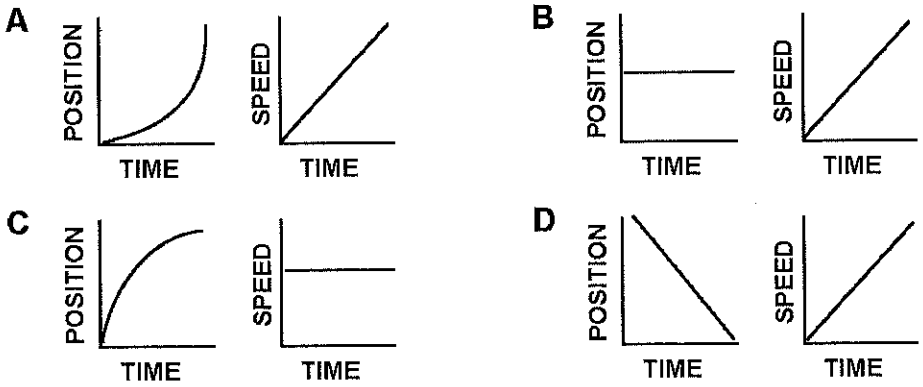
____ 46. The slope of the line of a graph is calculated by:
a. dividing the change in the horizontal values by the change in the vertical values.
b. multiplying the change in the horizontal values by the change in the vertical values.
c. dividing the change in the vertical values by the change in the horizontal values.
d. multiplying the change in the vertical values by the change in the horizontal values.

____ 47. Which two graphs represent the motion of an object on which the net force is zero?



a. 1
b. 2
c. 3
d. 4

____ 48. Which pair of graphs represents the same motion?



a. A
b. B
c. C
d. D

____ 49. "Forces occur in pairs" is another way of stating Newton's:
a. first law of motion.
b. second law of motion.
c. third law of motion.
d. universal law of motion.

____ 50. Even though every action force has an equal but opposite reaction force, they do not cancel one another and motion may still occur because the:
a. action and reaction forces are applied to the same object.
b. action and reaction forces are applied to different objects.
c. two forces have different magnitudes.
d. two forces have equal magnitudes.

____ 51. A rocket can fly into space because:
a. the exhaust gases push against the ground and the ground, in turn, pushes the rocket.
b. the rocket pushes on exhaust gases and the exhaust gases push back on the rocket.
c. as the fuel burns, the rocket's mass decreases reducing the force of gravity on the rocket.
d. the launch pad absorbs momentum that it imparts to the rocket.

____ 52. While standing on a stationary skateboard, Jolene tosses a heavy ball horizontally toward one end of her skateboard. The skateboard moves. Assuming there is no friction in the system when the ball is tossed, which statement about the momentum of the heavy ball is INCORRECT?
   a. The ball's momentum is equal in size to the momentum of Jolene and her skateboard.
   b. The ball's momentum plus the momentum of Jolene and her skateboard equals zero.
   c. The ball's momentum has increased because Jolene has tossed it.
   d. The directions of the ball's momentum and Jolene's momentum are the same.

____ 53. The skateboard on which you are standing moves as one of your feet pushes on the ground because the force you apply on the skateboard:
   a. equals the force applied to you by the skateboard.
   b. is larger than the force applied to you by the skateboard.
   c. equals the force applied by the ground on the skateboard.
   d. is larger than the force applied by the ground on the skateboard.

____ 54. The force that resists the motion of objects or surfaces in contact with one another is called ____ force.
   a. inertial
   b. frictional
   c. normal
   d. net

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

IMPULSE AND MOMENTUM

____ 1. "Forces occur in pairs" is another way of stating Newton's:
   a. first law of motion.
   b. second law of motion.
   c. third law of motion.
   d. universal law of motion.

____ 2. The impulse applied to an object is equal to the change in the object's:
   a. mass.
   b. inertia.
   c. momentum.
   d. height.

____ 3. To increase the final momentum of a racquetball, the player should:
   a. swing the racquet as fast as possible.
   b. follow through when hitting the ball.
   c. increase contact time with the ball.
   d. All of the above

____ 4. The impulse necessary to change the momentum of a 50 -kilogram object at rest to 5 kg·m/sec is:
   a. 5 kg·m/sec.
   b. 10 kg·m/sec.
   c. 125 kg·m/sec.
   d. 250 kg·m/sec.

____ 5. A rocket can fly into space because:
   a. the exhaust gases push against the ground and the ground, in turn, pushes the rocket.
   b. the rocket pushes on exhaust gases and the exhaust gases push back on the rocket.
   c. as the fuel burns, the rocket's mass decreases reducing the force of gravity on the rocket.
   d. the launch pad absorbs momentum that it imparts to the rocket.

____ 6. The momentum of a 2000 kilogram car traveling at 20 meters per second is:
   a. 0 kg·m/sec.
   b. 0.001 kg·m/sec.
   c. 100 kg·m/sec.
   d. 40,000 kg·m/sec.

____ 7. If a 30,000 kilogram rocket were traveling from its launch pad at a speed of 150 meters per second, 650 kilograms of gases would be expelled from the rocket at a speed of about:
   a. 0.33 m/sec.
   b. 200 m/sec.
   c. 21,000 m/sec
   d. 7,200 m/sec.

____ 8. Jumping on a trampoline, Jeffrey can easily soar 6 feet into the air but can only jump 2 feet from the blacktop of the driveway basketball court because the:
   a. court applies a larger impulse.
   b. trampoline applies a larger impulse.
   c. court applies less force on Jeffrey.
   d. trampoline applies more force on Jeffrey.