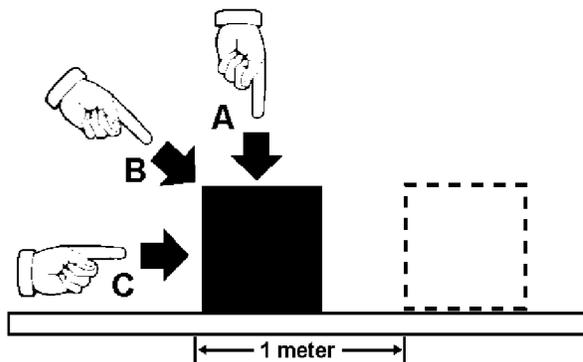


**Physics SIA #3 Review****Multiple Choice**

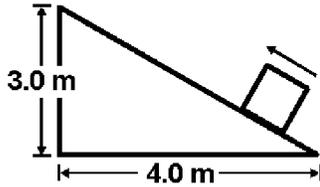
Identify the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1. The metric unit for work is the:
- newton.
  - joule.
  - watt.
  - meter.
- \_\_\_\_\_ 2. If forces A, B and C are equal, the work done by the forces as they are exerted on the box is:



- greatest for force A.
  - greatest for force B.
  - greatest for force C.
  - the same for all forces.
- \_\_\_\_\_ 3. A unit used to measure power is the:
- joule.
  - newtons per second.
  - newton-meter.
  - watt.
- \_\_\_\_\_ 4. An automobile jack exerts a force of 4,500 newtons to raise a car 0.25 meters. The amount of work done by the jack is about \_\_\_\_\_ joules.
- 0.00056
  - 1,100
  - 4,500
  - 18,000

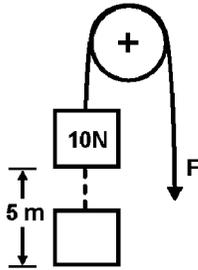
- \_\_\_\_\_ 5. A 60-newton block at rest at the bottom of a frictionless incline plane is pushed up the incline:



The amount of work done against gravity is \_\_\_\_\_ joules.

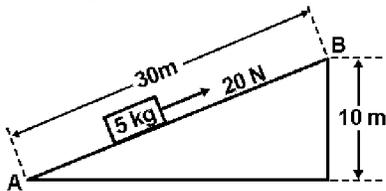
- a. 0  
b. 20  
c. 60  
d. 180
- \_\_\_\_\_ 6. The action that would require no work to be done is:  
a. holding a 100-pound object over your head.  
b. pushing a 25-kilogram box of books across the floor.  
c. pedaling a 100-newton bicycle up a small hill.  
d. lifting a balloon filled with air from the floor to a desktop.
- \_\_\_\_\_ 7. A 2.2-kilogram crate is pulled by a 30-newton force over a distance of 5 meters. The work done by pulling the crate is \_\_\_\_\_ joules.  
a. 11  
b. 66  
c. 150  
d. 330
- \_\_\_\_\_ 8. When a force applied to an object causes the object to move in the direction of the force, the object acquires:  
a. energy.  
b. mechanical advantage.  
c. efficiency.  
d. friction.
- \_\_\_\_\_ 9. Running up a flight of stairs, Maria generates 450 watts of power. If it takes her 6 seconds to go up the stairs, the amount of work she does in running up the stairs is \_\_\_\_\_ joules.  
a. 0.013  
b. 75  
c. 450  
d. 2,700
- \_\_\_\_\_ 10. Jasmine, who weighs 400 newtons, moves up a 5.0-meter climbing wall in 15 seconds. The amount of power generated by Jasmine as she climbs the wall is about \_\_\_\_\_ watts.  
a. 130  
b. 2,000  
c. 6,000  
d. 30,000

- \_\_\_ 11. 60 joules of work are required to lift the 10-newton object 5.0 meters as shown in the diagram:



The amount of work done in overcoming friction as the weight is lifted is \_\_\_\_ joules.

- 10
  - 50
  - 60
  - 300
- \_\_\_ 12. The diagram shows a 20-newton force being used to pull a 5-kilogram object up a hill at a constant speed:

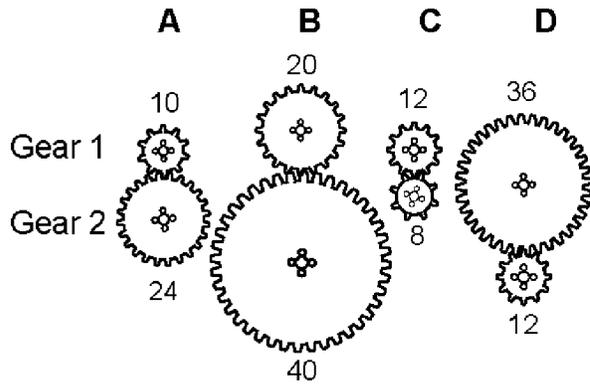


The amount of work done **against** gravity in moving the object from point A to point B is about \_\_\_\_ joules.

- 100
  - 200
  - 500
  - 600
- \_\_\_ 13. Jordan lifts a 100-kilogram barbell from the floor to a height of 2.0 meters in 1.5 seconds. The amount of power he generates is about \_\_\_\_ watts.
- 130
  - 200
  - 1,310
  - 1,960
- \_\_\_ 14. An electrical water heater raises the temperature of water by adding 8,000 joules of energy to the water in 40 seconds. The minimum power that must be supplied to the heater is \_\_\_\_ watts.
- 0.005
  - 200
  - 3,200
  - 320,000
- \_\_\_ 15. The simple machine that operates as a ramp that curves around a shaft is a:
- rope and pulley system.
  - screw.
  - lever.
  - gear.

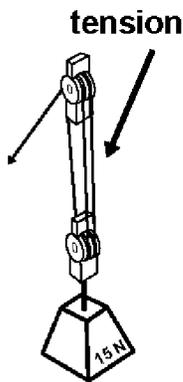
- \_\_\_\_\_ 16. In a theoretical machine, work output:
- can be calculated by dividing output distance by output force.
  - is always greater than the work input.
  - can be calculated by multiplying output force by output distance.
  - is always less than the work input.
- \_\_\_\_\_ 17. All of the following are considered to be simple machines EXCEPT:
- scissors.
  - a bicycle.
  - a jackknife.
  - a see-saw.
- \_\_\_\_\_ 18. The force directed along the ropes of a rope and pulley system is called:
- thread.
  - lead.
  - mechanical advantage.
  - tension.
- \_\_\_\_\_ 19. The fixed point around which levers rotate is called the:
- input arm.
  - output arm.
  - fulcrum.
  - lever arm.
- \_\_\_\_\_ 20. Talia pulls her younger brother in a wagon 30 meters to the top of a ramp 3 meters high. If the ramp is frictionless, the mechanical advantage of this ramp is:
- 0.10
  - 10
  - 27
  - 33
- \_\_\_\_\_ 21. The mechanical advantage of a lever is the ratio of the:
- length of the input arm to the length of the output arm.
  - length of the output arm to the distance the object moves.
  - input force to the output force.
  - input force to the distance the object moves.

\_\_\_ 22. If the top gear in each picture makes one complete turn, which bottom gear makes the greatest number of turns?



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

\_\_\_ 23. The diagram illustrates a rope and pulley system being used to raise a 15-newton weight:



The tension in the rope indicated in the diagram is \_\_\_ newtons.

- a. 5
- b. 10
- c. 15
- d. 20

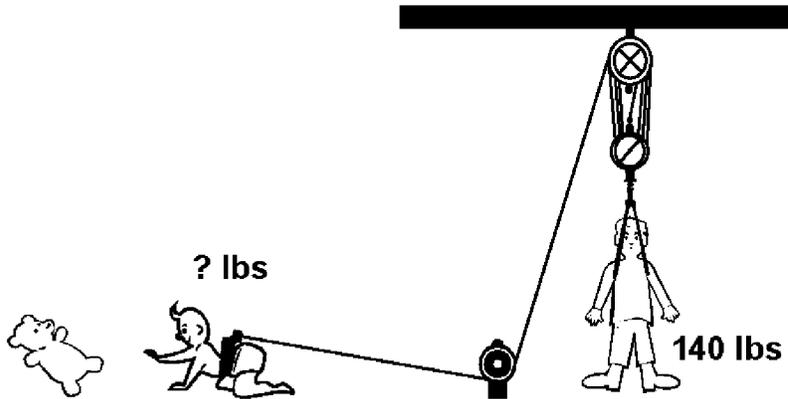
\_\_\_ 24. A simple machine will sometimes multiply your:

- a. work.
- b. force.
- c. energy.
- d. All of the above

\_\_\_ 25. If the output force of a lever is greater than the input force, the:

- a. length of the input arm is greater than the length of the output arm.
- b. mechanical advantage of the lever is less than one.
- c. mechanical advantage of the lever is equal to one.
- d. length of the output arm is greater than the length of the input arm.

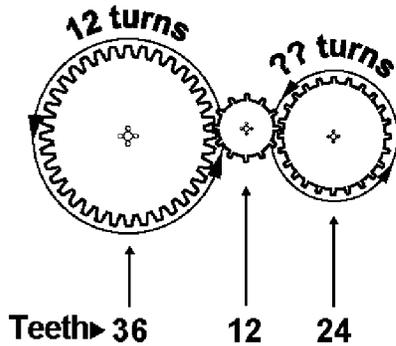
\_\_\_ 26. The diagram pictures a pulley system using 7 supporting ropes:



If the boy in the picture weighs 140 pounds, the number of pounds of force the baby must exert to lift the boy is:

- a. 70.
- b. 35.
- c. 20.
- d. 7.

\_\_\_ 27. The diagram shows a gear system:



If the input gear turns 12 times, the number of turns made by the output gear is:

- a. 12.
- b. 18.
- c. 24.
- d. 48.

\_\_\_ 28. A screw with a lead of 0.80 millimeters and a circumference of 24 millimeters is turned into a board using a screwdriver with a mechanical advantage of 4. The total theoretical mechanical advantage is:

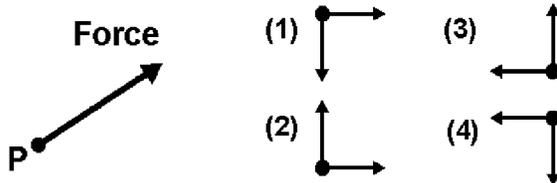
- a. 1.3
- b. 3.0
- c. 4.8
- d. 120

- \_\_\_\_ 29. Josephine slides a 150-newton box 12 meters up an incline plane. If the incline plane lifts the box 4 meters as she pushes with a 60-newton force, the work input done by Josephine is \_\_\_\_ joules.
- 48
  - 600
  - 720
  - 9,000
- \_\_\_\_ 30. The measure of how effective a machine is in using energy to do work is called:
- work output.
  - transformation.
  - mechanical advantage.
  - efficiency.
- \_\_\_\_ 31. Friction is a “catch-all” term for many processes that oppose:
- heat.
  - wear.
  - motion.
  - None of the above
- \_\_\_\_ 32. As fuel burns in a jet engine, it releases 40,000 joules of energy. The energy can be used to do 16,000 joules of work. The efficiency of the engine is \_\_\_\_ percent.
- 20
  - 40
  - 60
  - 250
- \_\_\_\_ 33. The work output is 500 joules for a machine that is 25 percent efficient. The work input is \_\_\_\_ joules.
- 125
  - 1,000
  - 2,000
  - 12,500
- \_\_\_\_ 34. An incandescent light bulb uses 60 joules of electrical energy every second. **Due to heat loss**, the energy available for light is reduced to only 6 joules per second. If this bulb is used to keep eggs warm in an incubator, about how efficient is the light bulb at producing **heat**?
- 10 percent.
  - 20 percent.
  - 60 percent.
  - 90 percent.
- \_\_\_\_ 35. Luis lifts a 500-newton load in a wheelbarrow 0.15 meters by raising the handles of the wheelbarrow 0.40 meters with a 200-newton force. The amount of work used to overcome friction is \_\_\_\_ joules.
- 5
  - 75
  - 80
  - 200

- \_\_\_\_\_ 36. A word meaning “size” often used to describe scalar quantities is:
- magma.
  - magenta.
  - vector.
  - magnitude.
- \_\_\_\_\_ 37. A measured quantity that is described by stating a size and a direction is called a:
- scalar.
  - magnitude.
  - vector.
  - victim.
- \_\_\_\_\_ 38. If a force vector acting in a northeast direction is resolved into its components, any vector acting in the north-south direction would be called a(n):
- hypotenuse.
  - $x$ -component.
  - $y$ -component.
  - resultant.
- \_\_\_\_\_ 39. Vector quantities include all of the following EXCEPT:
- velocity.
  - force.
  - speed.
  - acceleration.
- \_\_\_\_\_ 40. A scalar is a quantity that can be completely described using:
- direction only.
  - magnitude only.
  - both magnitude and direction.
  - either magnitude or direction.
- \_\_\_\_\_ 41. Jade pulls on a wagon with 3 newtons of force toward north. Lara pulls on the wagon with 4 newtons of force toward east. The magnitude of the wagon’s resultant force is \_\_\_\_\_ newton(s).
- 1
  - 5
  - 7
  - 25
- \_\_\_\_\_ 42. Forces in a diagram are represented by the following scale: 1 centimeter equals 5 newtons. To represent a force of 20 newtons, the length of an arrow drawn to represent the force should be \_\_\_\_\_ centimeter(s).
- 1
  - 4
  - 5
  - 20

- \_\_\_ 43. Lily pushes a box with 50 newtons toward east. Mia pushes on the same box with 50 newtons toward south. The direction of the box's resultant force is most clearly stated as:
- 45°.
  - 135°.
  - 225°.
  - 315°.

- \_\_\_ 44. The diagram below represents a force acting at point P:

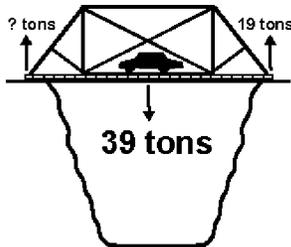


The pair of forces that could represent  $x$  and  $y$  components of this force are:

- 1
  - 2
  - 3
  - 4
- \_\_\_ 45. Maya kicks a soccer ball 2 newtons toward north. At the exact same time, Casey kicks the same ball toward west. The resultant force of the soccer ball is about 36 newtons. The force that Casey kicks the soccer ball toward west is \_\_\_ newtons.
- 16
  - 20
  - 30
  - 56
- \_\_\_ 46. The relationship between a spring's change in length and the force it exerts is called:
- Newton's law.
  - Hooke's law.
  - Archimedes' principle.
  - Galileo's theory.
- \_\_\_ 47. When a spring is compressed:
- the potential energy stored in the spring increases.
  - the potential energy stored in the spring decreases.
  - the spring constant of the spring is decreased.
  - the spring constant of the spring is increased.
- \_\_\_ 48. When the net force acting on an object is zero, this ALWAYS causes a condition of motion referred to as:
- rest.
  - positive acceleration.
  - negative acceleration.
  - equilibrium.

- \_\_\_ 49. When you are seated in a chair, the force exerted on you by the chair is called the:
- normal force.
  - gravitational force.
  - weight.
  - mass.
- \_\_\_ 50. A dictionary whose mass is 1.0 kilograms lying on a stationary table exerts a force of 9.8 newtons on the table. The force exerted on the dictionary by the table is \_\_\_ newtons.
- 1.0
  - 8.8
  - 9.8
  - 10.8

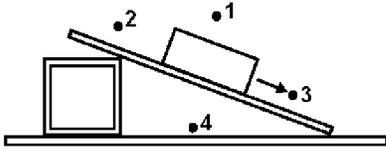
- \_\_\_ 51. A car drives from east to west over a bridge supported by the ground at either end as illustrated in the diagram:



- The force exerted by the ground on the bridge at the west end is \_\_\_ tons.
- 58
  - 39
  - 20
  - 19
- \_\_\_ 52. Eric is pedaling his bicycle due west on the Mohawk River bicycle path at a constant speed of 17 miles per hour. As he is pedaling, a 3 mile per hour wind is blowing from the east. The statement that best describes the forces acting on Eric's bicycle is:
- the net force acting on the bike is zero.
  - a greater net force is acting toward the east.
  - a greater net force is acting toward the west.
  - Not enough information is given to answer the question.
- \_\_\_ 53. A force of 2 newtons is required to stretch a spring 4 centimeters. The amount of force required to stretch the same spring 8 centimeters is \_\_\_ newton(s).
- 1
  - 2
  - 4
  - 8
- \_\_\_ 54. If the stretching force on a spring is doubled, the length of the spring will be:
- unchanged.
  - doubled.
  - quadrupled.
  - halved.

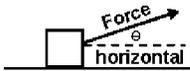
- \_\_\_\_\_ 55. A spring with a large spring constant:
- always stretches a large amount.
  - never stretches a large amount.
  - stretches a large amount with a small force.
  - stretches a small distance with a large force.
- \_\_\_\_\_ 56. The force that resists the motion of objects or surfaces in contact with one another is called \_\_\_\_\_ force.
- inertial
  - frictional
  - normal
  - net
- \_\_\_\_\_ 57. The force of friction between two surfaces can be reduced by all of the following EXCEPT:
- separating surfaces with a lubricant.
  - changing rolling friction to sliding friction.
  - separating surfaces with a layer of air.
  - sanding rough surfaces smoother.
- \_\_\_\_\_ 58. Two moving surfaces are in contact with one another. The force of friction between the surfaces can be changed by all of the following methods EXCEPT:
- placing lubrication between the surfaces.
  - changing the types of surfaces.
  - changing the force used to move the surfaces.
  - altering the force pushing the two surfaces together.
- \_\_\_\_\_ 59. To overcome static friction to start an object sliding on a level surface, a 100-newton force is used. The magnitude of the force needed to keep the object the sliding is:
- more than 100 newtons.
  - equal to 100 newtons.
  - less than 100 newtons.
  - unknown using the given information.
- \_\_\_\_\_ 60. Of the following, the statement about friction which is NOT true is:
- friction is always present.
  - friction can be useful.
  - friction can be harmful.
  - friction can be eliminated.
- \_\_\_\_\_ 61. As Joshua accelerates in his pickup truck at  $2.0\text{m/sec}^2$ , a 200-kilogram box in the back does not slide. The force of friction that must act on the box to keep it from slipping in the back of the truck is \_\_\_\_\_ newtons.
- 100
  - 200
  - 400
  - 1,960

- \_\_\_ 62. The diagram below represents a box sliding down an incline:



The force of friction acting on the box is directed toward:

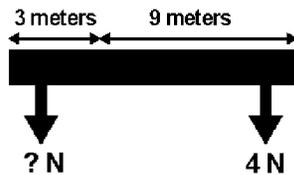
- a. 1  
 b. 2  
 c. 3  
 d. 4
- \_\_\_ 63. Pulling on a rope with a force of 100 newtons at an angle  $\theta$  of 30 degrees, Cheung pulls a box across a surface at a constant speed:



The magnitude of the frictional force resisting the motion is \_\_\_\_\_ newtons.

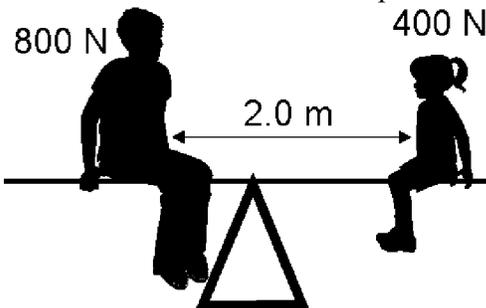
- a. 100  
 b. 87  
 c. 50  
 d. 0
- \_\_\_ 64. The line about which an object turns is called the:
- a. torque.  
 b. axis of rotation.  
 c. radius.  
 d. lever arm.
- \_\_\_ 65. As the force applied to a rotating object is moved farther from the axis of rotation, the torque created by the force:
- a. increases.  
 b. decreases.  
 c. is always clockwise.  
 d. is always perpendicular to the lever arm.
- \_\_\_ 66. Aaron applies a 70.0-newton force to the handle of a wrench at a distance of 0.350 meters from the nut on the axle of his bicycle wheel. The amount of torque applied to the nut is \_\_\_\_\_ newton-meters.
- a. 0.005  
 b. 24.5  
 c. 70.35  
 d. 200

- \_\_\_ 67. The diagram represents a lever to which forces are applied:



To create rotational equilibrium, the force exerted at the left end of the lever must be \_\_\_\_ newtons.

- a. 36  
b. 27  
c. 12  
d. 4
- \_\_\_ 68. Juan and his younger sister Ana are able to balance when seated on a see-saw. Juan weighs 800 newtons and sits 2.0 meters from the balance point. Ana weighs 400 newtons.

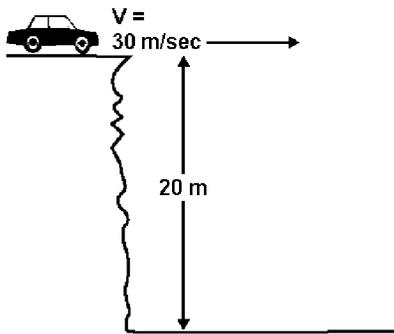


To create rotational equilibrium, the distance she must sit from the balance point is \_\_\_\_ meter(s).

- a. 1.0  
b. 2.0  
c. 4.0  
d. 8.0
- \_\_\_ 69. The parabolic path followed by a projectile is referred to as the:
- a. range.  
b. trajectory.  
c. circumference.  
d. ellipse.
- \_\_\_ 70. A golf ball will have the greatest range when it is hit an angle of:
- a.  $30^\circ$ .  
b.  $45^\circ$ .  
c.  $60^\circ$ .  
d.  $90^\circ$ .
- \_\_\_ 71. The distance a projectile travels is dependent upon:
- a. air resistance.  
b. launch angle.  
c. launch speed.  
d. All of the above

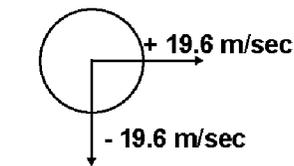
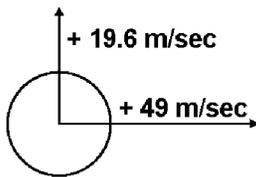
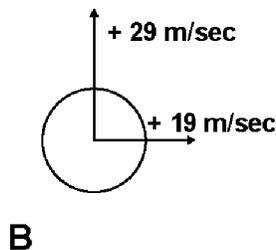
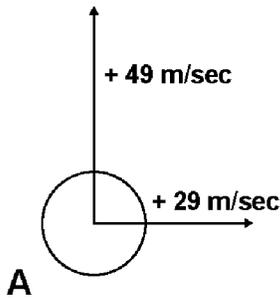
- \_\_\_\_\_ 72. The distance a projectile travels horizontally in the air may be called its:
- trajectory.
  - range.
  - parabola.
  - height.
- \_\_\_\_\_ 73. If a ball thrown horizontally with a speed of 15 meters per second travels for 5 seconds before hitting the ground, its range after 4 seconds would be about \_\_\_\_\_ meters.
- 15
  - 39
  - 60
  - 153
- \_\_\_\_\_ 74. Of the following, the one that would NOT be considered a projectile is a:
- crow flying between trees.
  - football thrown by a high school quarterback.
  - tennis ball hit by a star tennis player.
  - fox jumping over a wall.
- \_\_\_\_\_ 75. Jennifer and Tamar throw a snowballs at the same time horizontally from a height of 1.5 meters. Jennifer throws hers at a speed of 6.0 meters per second. If Tamar throws hers at 12 meters per second, her snowball will:
- travel the same distance as Jennifer's before hitting the ground.
  - hit the ground later than Jennifer's.
  - travel the half the distance as Jennifer's before hitting the ground.
  - hit the ground at the same time as Jennifer's.
- \_\_\_\_\_ 76. The golf ball that will travel farthest is one hit at an angle of:
- 20°.
  - 30°.
  - 40°.
  - 60°.
- \_\_\_\_\_ 77. If a ball thrown horizontally with a speed of 15 meters per second travels for 5 seconds before hitting the ground, its horizontal speed after 4 seconds is \_\_\_\_\_ m/sec.
- 15
  - 39
  - 60
  - 75

78. A stunt car driver traveling at 30 meters per second drives his car off a 20 meter high cliff as illustrated in the diagram:



How far from the base of the cliff does the car hit?

- 41 meters
  - 61 meters
  - 82 meters
  - 122 meters
79. A soccer ball is kicked into the air with an initial vertical velocity of +49 meters per second and a horizontal velocity of +19.6 meters per second. The diagram representing the vertical and horizontal velocity of the ball after 2 seconds of flight is:

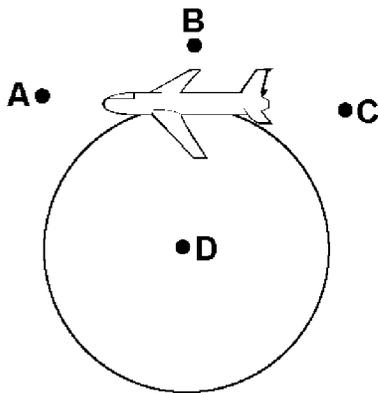


- A
- B
- C
- D

- \_\_\_\_\_ 80. A water balloon leaves a launcher at a certain speed and travels 125 yards when launched at an angle of  $23^\circ$  to the ground. If launched at the same speed, it would travel the same distance when launched at an angle of:
- $22^\circ$ .
  - $46^\circ$ .
  - $67^\circ$ .
  - $77^\circ$ .
- \_\_\_\_\_ 81. A projectile launched at a speed of 35 meters per second will have the greatest horizontal speed when launched at an angle of:
- $20^\circ$ .
  - $30^\circ$ .
  - $45^\circ$ .
  - $60^\circ$ .
- \_\_\_\_\_ 82. Angular speed can measure:
- the rate at which an object moves in a straight line.
  - the rate at which an object revolves around an external axis.
  - the rate at which an object rotates around an internal axis
  - both the rate of rotating and revolving.
- \_\_\_\_\_ 83. An example of rotation is:
- Earth moving in its orbit around the sun.
  - a basketball spinning on the end of a finger.
  - a race car traveling at 200 miles per hour around a circular track.
  - a student riding at the outside position on a merry-go-round.
- \_\_\_\_\_ 84. Mao watches a merry-go-round as it turns 27 times in 3 minutes. The angular speed of the merry-go-round is \_\_\_\_\_ rpm.
- 81
  - 27.
  - 9
  - 0.11
- \_\_\_\_\_ 85. Three students are seated on a merry-go-round. Randy is seated closest to the center, Toby is seated near the outer edge, and Rasheed is seated between them. As the merry-go round turns:
- Randy has the greatest linear speed but the lowest angular speed.
  - Toby has the highest linear speed and the same angular speed as the others.
  - Rasheed has the same linear speed as the others but the highest angular speed.
  - All three students have the same linear and angular speed.
- \_\_\_\_\_ 86. Anika twirls a ball on a string which is 3.0 meters long. If the ball makes 2 revolutions per second, the linear speed of the ball is about \_\_\_\_\_ m/sec.
- 6
  - 10
  - 19
  - 38

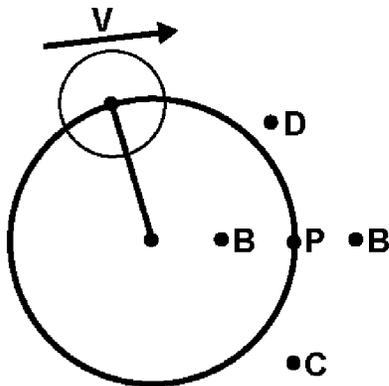
- \_\_\_\_\_ 87. Spiderman swings on the end of a web that is 20 meters long in an arc of 45 degrees to get from one building to another. The trip takes him 5.0 seconds. Spiderman travels from building to building at a linear speed of about \_\_\_\_\_ m/sec.
- 2.0
  - 6.3
  - 10
  - 31
- \_\_\_\_\_ 88. A record rotating a 33 RPM's has an angular speed of:
- 33°/min.
  - 55°/sec.
  - 198°/sec.
  - 55°/min.
- \_\_\_\_\_ 89. Erica pedals her bicycle from home to a local store 2.5 miles (13,200 feet) away. The wheels on Erica's bicycle have a diameter of 27 inches. The number of revolutions made by the wheels of her bicycle on this ride is about:
- 1,100.
  - 1,900.
  - 13,000.
  - 22,000.
- \_\_\_\_\_ 90. The speedometer on a bicycle registers speed by converting angular speed of the bicycle's wheel to linear speed. What is the approximate speed that would be indicated by the speedometer of a bicycle wheel with a diameter of 0.70 meters rotating at a rate of 3.0 rotations per second?
- 2.2 m/sec
  - 4.3 m/sec
  - 6.6 m/sec.
  - 21 m/sec.
- \_\_\_\_\_ 91. Any force that causes an object to move in a circle is called \_\_\_\_\_ force.
- gravitational
  - centripetal
  - linear
  - frictional
- \_\_\_\_\_ 92. The source of the centripetal force that allows a race car to go around a corner is:
- gravity.
  - friction.
  - inertia.
  - momentum.
- \_\_\_\_\_ 93. The weight of an automobile depends upon all of the following factors EXCEPT the:
- speed of the automobile on the road.
  - mass of the earth.
  - mass of the automobile.
  - distance of the automobile from the Earth's center.

- \_\_\_ 94. You cannot feel a gravitational force acting between you and a friend because:
- gravity is a force applied only by Earth.
  - living things do not exert any gravitational force.
  - the mass of a person is not large enough to exert gravitational force that can be felt.
  - the distance between attracting objects must be very large for gravity to act.
- \_\_\_ 95. The path followed by one object as it revolves around another is called its:
- trajectory.
  - orbit.
  - satellite.
  - center of mass.
- \_\_\_ 96. Factors that affect the amount of centripetal force on an object moving in a circle include all of the following EXCEPT:
- speed of the object.
  - radius of revolution.
  - mass of the object.
  - direction of motion (clockwise or counterclockwise).
- \_\_\_ 97. All of the following represent objects that are being accelerated EXCEPT a:
- car moving around a corner at a constant speed of 30 miles per hour.
  - competitor in a track meet increasing speed at the finish line to pass another runner.
  - bird flying in a straight line from one tree to another at high speed.
  - jet airliner banking into a turn as it slows to prepare for a landing.
- \_\_\_ 98. According to the diagram, the direction of the centripetal force on the airplane is directed toward:



- A
- B
- C
- D

- \_\_\_ 99. If you climb a hill, you are farther from the center of Earth. Due to your new location, your weight will:
- decrease by a tiny amount.
  - decrease by a large amount.
  - increase by a tiny amount.
  - increase by a large amount.
- \_\_\_ 100. The factor that will INCREASE your weight the MOST is:
- doubling your mass.
  - halving your mass.
  - doubling your distance from the Earth's center.
  - halving your distance from the Earth's center.
- \_\_\_ 101. If the radius of the curve around which a car is driven is increased, the following can be said about the centripetal force required to cause the car to go around the corner at constant speed:
- The centripetal force increases.
  - The centripetal force decreases.
  - The centripetal force remains the same.
  - There is insufficient information to make a determination about the centripetal force.
- \_\_\_ 102. A ball is being twirled on the end of a string as pictured in the diagram:



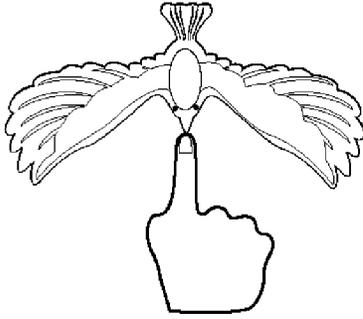
- If the string is released when the ball reaches point P, the inertia of the ball will cause it to move in the direction of:
- A
  - B
  - C
  - D
- \_\_\_ 103. The centripetal force on a 20-kilogram object revolving on the end of a 10-meter long cord is 20 newtons. If the linear speed of the object is doubled, the centripetal force required to keep it moving in a circle of the same radius is \_\_\_ newtons.
- 10
  - 40
  - 80
  - 200

- \_\_\_\_ 104. Examples of centripetal force includes all of the following EXCEPT:
- gravity of the sun acting to keep Earth in orbit.
  - the door of a car pushing on a passenger as the car rounds a corner.
  - the friction between a dragster and the track as the car accelerates down the drag strip.
  - the force of the air pushing on the wings of a plane as it makes a turn.
- \_\_\_\_ 105. The force required to keep an object moving in a circle of the same radius while its mass is doubled and its speed is reduced to half would be:
- the same.
  - doubled.
  - halved.
  - quadrupled.
- \_\_\_\_ 106. If the distance between two objects is doubled while the masses of both objects are doubled, the gravitational force between them is:
- halved.
  - the same.
  - doubled.
  - quadrupled.
- \_\_\_\_ 107. The mass of the planet Jupiter is 318 times greater than the Earth's mass, and its radius is 11.2 times greater than that of the Earth. If it were possible to stand on the outermost region of Jupiter, your weight would be:
- 318 times greater than on Earth.
  - 28.4 times greater than on Earth.
  - 2.54 times greater than on earth
  - 318 times less than on Earth.
- \_\_\_\_ 108. The point around which an object naturally spins is called its:
- trajectory.
  - orbit.
  - satellite.
  - center of mass.
- \_\_\_\_ 109. A sport utility vehicle will roll over if the:
- center of gravity is raised above its area of support.
  - area of support includes the center of mass.
  - center of mass passes outside of the area of support.
  - torque caused by the object's weight is balanced.
- \_\_\_\_ 110. The center of mass of an object:
- is always the same as the center of gravity.
  - does not exist if the object has an irregular shape.
  - is sometimes outside of the object.
  - is always somewhere inside the object.

Name: \_\_\_\_\_

ID: A

\_\_\_ 111.



This toy bird balances on the tip of the finger because:

- a. the torque caused by the force of the bird's weight is greater at the beak than the tail.
- b. the center of gravity is in line with the finger.
- c. the bird's weight is outside its area of support.
- d. It can't possibly balance like that. It must be glued onto the finger.