Science Bowl Questions: Set #2

1. A vector equal and opposite of a resultant vector is called what?

Answer: Equilibrant

1. In a velocity versus time graph, at what point does the object reach its highest point?

Answer: the x-intercept (when the graph crosses the x-axis)

1. In a displacement versus time graph, at what point does the object reach its highest point?

Answer: the maximum y-value

1. If no other forces are acting upon an object, the normal force is equal to what other force?

Answer: weight (gravity)

1. In uniform circular motion, this fictitious force that is based on the frame of reference is called what?

Answer: centrifugal force

1. Name the two types of collisions.

Answer: elastic and inelastic

1. What quantity is conserved during elastic collisions but not during inelastic collisions?

Answer: kinetic energy

1. What quantity is conserved in both elastic and inelastic collisions?

Answer: momentum

1. The fixed pivot point on a lever is called what?

Answer: fulcrum

1. Torque on an object gives rise to what other quantity?

Answer: angular acceleration

1. In reference to seesaws, what direction, relative to the ground, is “positive?”

Answer: counterclockwise

1. Seesaw equilibrium depends on two quantities. Name them.

Answer: weight and distance from fulcrum

1. The product of force and a perpendicular moment arm distance yields what quantity?

Answer: torque

1. Name the term for an object’s maximum velocity in free fall.

Answer: terminal velocity

1. Name the simple machine that is used to slide objects up to a platform or other elevated area.

Answer: inclined plane

1. The force that is exerted on a simple machine is called what?

Answer: effort force

1. Name the simple machine that among its members includes bottle openers, oars, and crowbars.

Answer: lever

1. What class is a lever that has the fulcrum between the effort force and the resistance force?

Answer: 1st class

1. What class is a lever that has the resistance force between the effort force and the fulcrum?

Answer: 2nd class

1. What class is a lever that has the effort force between the resistance force and the fulcrum?

Answer: 3rd class

1. If a weight of 400N is to be lifted and the effort force needed is 100N, what is this simple machine’s mechanical advantage?

Answer: 4

1. A machine puts out 350J of useful work for every 500J inputted. What is the efficiency of this machine?

Answer: 70%

1. Under ideal conditions, the length of an inclined plane divided by the height of the plane equals what value?

Answer: ideal mechanical advantage

1. What is the mechanical advantage of a fixed pulley that hangs the weight on its left side, loops the rope over the top of the pulley, and has the effort force pulling down on the right?

Answer: 1

1. If the speed of an object is tripled, its kinetic energy is how many times its original?

Answer: 9

A person having a mass of 60kg exerts a horizontal force of 200N in pushing a 90kg object a distance of 6 meters along a horizontal floor. He does this at constant velocity in 6 seconds.

1. Using g = 10 m/s2, what is the weight of this person?

Answer: 600N

1. The work done by this person, in joules, is what?

Answer: 1200J

1. The force of friction is what?

Answer: 200N

The 1,000N weight of a pile-driver falls freely from rest and drops 25 meters. It strikes a steel beam, driving it 3cm into the ground.

1. The kinetic energy of the weight of the pile-driver right before it hits the beam is what?

Answer: 25000J

1. The velocity of the weight just before hitting the beam, in m/s to the nearest integer, is what?

Answer: -22 m/s

Math

1. An icosahedron has faces of what shape?

Answer: Triangles

1. Which Greek philosopher are the Platonic solids named after?

Answer: Plato

1. The dodecahedron is covered in faces of what shape?

Answer: Pentagons

1. As a polygon approaches an infinite number of sides, what geometric figure does it become?

Answer: Circle

1. How many possible 7-digit telephone numbers can be made from the following criteria:

The first number is not even.

The third number is prime.

The fourth and fifth numbers, when added, yield an odd number.

The seventh number is 1.

Answer: 5x10x4x10x10x10x1=200000

1. What is the derivative of ?

Answer: -10sin5x

1. The indefinite integral of x is what?

Answer:

1. How many sides of a cube must be painted red so that when picking two adjacent faces, one will always be red?

Answer: Five

1. How many prime numbers are there between 1 and 20?

Answer: 8

1. 45% of what number is 90?

Answer: 200