Prince Sultan University
Orientation Mathematics Program
SCI 101Midterm Examination
Semester I, Term 091

SCI 101 First Exam Nov. 9th 2009 H.S.

Part 1: ***(1 point each)***

1. In the absence of an external force, a moving object will

A) stop immediately. B) slow down and eventually come to a stop.
C) move faster and faster. D) move with constant velocity.
E) move with constant velocity for a while and then slow to a stop.

2. When a parachutist jumps from an airplane, he eventually reaches a constant velocity, called the terminal velocity. This means that

A) the acceleration is equal to *g*. B) the effect of gravity has died down.
C) the force of air resistance is equal to zero.
D) the effect of gravity increases as he becomes closer to the ground.
E) the force of air resistance is equal to the weight of the parachutist.

3. A stone is thrown straight up. When it reaches its highest point,

A) both its velocity and its acceleration are zero.
B) its velocity is zero and its acceleration is not zero.
C) its velocity is not zero and its acceleration is zero.
D) neither its velocity nor its acceleration is zero.
E) cannot determine.

4. You apply the same force to two objects. **Object 1** has mass ***M*** and **object 2** has mass **5*M*.** The acceleration of **object 2** is

A) ten times that of object 1. B) five times that of object 1.
C) the same as that of object 1. D) one-fifth as that of object 1.
E) has no relation to that of object 1.

5. An object of weight ***W*** is in free-fall close to the surface of Earth. What is the force that the object exerts on Earth?

A) a force greater than *W* B) a force less than *W*
C) a force equal to *W* D) no force at all
E) cannot be determined without additional information

6. The two measurements necessary for calculating **average speed** are

A) acceleration and time. B) velocity and time.
C) distance and time. D) displacement and time.
E) velocity and distance.

7. As an object freely falls, its

A) velocity increases. B) acceleration increases.
C) both of the above D) none of the above
E) will reach its terminal velocity and hangs up in air.

8. A hockey puck (disk) is set in motion across a frozen pond. If ice friction and air resistance are neglected, the force required to keep the puck sliding at constant velocity is

A) 0 N B) equal to the weight of the puck.
C) the weight of the puck divided by the mass of the puck.
D) the mass of the puck multiplied by 10 m/s/s.
E) none of these.

9. An object is in free-fall. At one instant, it travels at a speed of 50 m/s. Exactly 3 s later, its speed is about

A) 20 m/s B) 90 m/s C) 80 m/s D) 100 m/s E) 10 m/s

10. If a car increases its velocity from zero to 60 m/s in 10 s, its acceleration is

A) 3 m/s^2. B) 6 m/s^2. C) 10 m/s^2. D) 60 m/s^2. E) 600 m/s^2.

11. A piece of rope is pulled by two people in a tug-of-war. Each pulls with **400 N** of force. What is the tension in the rope?

A) 0 N B) 400 N C) 600 N D) 800 N E) none of the above.

<u>Part 2:</u> For the following problems, please show your work in the space provided to receive partial credit. ***(3 points each)***

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P. 1. Disregarding air drag, how fast must you toss (throw) a ball straight upward in order to remain in the air for a total time of **5 s**?

Answer:_____(with units)

P. 2. A catcher stops a ball traveling at **40 m/s** in **10 s** and feels a force of **600 N** against his glove. What is the mass of the ball?

Answer:_____(with units)