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

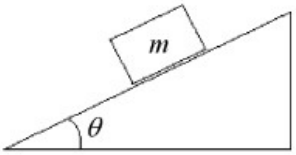
**1.** In the absence of an external force, a moving object will
A) stop immediately.
B) slow down and eventually come to a stop.
C) move faster and faster.
D) move with constant velocity for a while and then slow to a stop.
E) move with constant velocity.

**2.** A 777 aircraft has a mass of **300,000 kg**. At a certain instant during its landing, its speed is **27.0 m/s**. If the braking force is **435,000 N**, how much further does it travel along the runway before it comes to a stop?
A) 40.5 m B) 142 m C) 181 m D) 251 m E) 456 m.

**3.** A **50.0-kg** crate is being pulled along a horizontal, smooth surface. The pulling force is **10.0 N** and is directed **20.0°** above the horizontal. What is the acceleration of the crate?
A) 0.0684 m/s$^2$ B) 0.188 m/s$^2$ C) 0.200 m/s$^2$ D) 0.376 m/s$^2$
E) 0.0728 m/s$^2$

**4.** As a car drives with its tires rolling freely without any slippage, the type of friction acting between the tires and the road is
A) static friction. B) kinetic friction.
C) a combination of static and kinetic friction.
D) neither static nor kinetic friction, but some other type of friction.
E) It is impossible to tell what type of friction acts in this situation.

**5.** In the Figure below, the block of mass ***m*** is at rest on an inclined plane that makes an angle $\theta$ with the horizontal. The force of static friction ***f*** must be such that




A) $f > mg$. B) $f > mg\cos\theta$. C) $f > mg\sin\theta$.
D) $f = mg\cos\theta$. E) $f = mg\sin\theta$.

**6.** In the Figure of question 5 above, the normal force $F$ acting on the block must be such that
A) $f > mg$. B) $f > mg\cos\theta$. C) $f > mg\sin\theta$.
D) $f = mg\cos\theta$. E) $f = mg\sin\theta$.

**7.** If you walk **5.0 m** horizontally forward at a constant velocity carrying a **10 N** object, the amount of work you do is
A) more than 50 J. B) equal to 50 J. C) less than 50 J, but more than 0 J.
D) zero. E) not enough information.

**8.** Work done by STATIC FRICTION is always

A) parallel to the surface. B) perpendicular to the surface. C) positive.
D) negative. E) zero.

**9.** If the net work done on a moving object is zero, then the object's kinetic energy

A) decreases. B) remains the same. C) increases.
E) is zero. E) cannot be determined without knowing the object mass.

**10.** An object hits a wall and bounces back with **half** of its **original speed**. What is the ratio of the final kinetic energy to the initial kinetic energy?

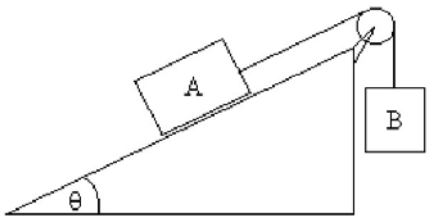
A) ½ B) ¼ C) 2 D) 4 E) 8

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

**P. 1.** An object of **1.0 kg** mass is pulled up an inclined plane by a constant force of **10 N** that causes a displacement of **0.50 m.** The angle of inclination with the horizontal is **30°.** Neglect friction and use $\boldsymbol{g = 10\ m/s^2}$**.** What is the work done by the **10 N** force on the object along the inclined plane?

**Answer:_____(with units)**

**P. 2.** Two masses are connected by a string which goes over an ideal pulley as shown below. Block **A** has a mass of **3.00 kg** and can slide along a rough plane inclined **30.0°** to the horizontal. The coefficient of static friction between block **A** and the plane is **0.400**. What mass should block **B** have in order to start block **A** sliding up the ramp? (H**int: draw a free body diagram for each block.**)




**Answer:_____(with units)**

*Good Luck*