Physics Problem Set #4

Due Thursday, Nov. 12

1. An applied force of 20 N is used to accelerate an object to the right across a frictional surface. The object encounters 10 N of friction. The force of gravity is 98 N. Draw a free-body diagram and determine the normal force, the net force, the coefficient of friction between the object and the surface, the mass, and the acceleration of the object. (Neglect air resistance.)

2. A rightward force is applied to a 6-kg object to move it across a rough surface at constant velocity. The object encounters 15 N of frictional force. Draw a free-body diagram and determine the gravitational force, normal force, net force, and applied (rightward) force as well as the coefficient of friction. (Neglect air resistance.)

3. A rightward force is applied to a 5-kg object to move it across a rough surface with a rightward acceleration of 2 m/s/s. The coefficient of friction between the object and the surface is 0.1. Draw a free-body diagram and determine the gravitational force, normal force, applied force, frictional force, and net force. (Neglect air resistance.)

4. Lee Mealone is sledding with his friends when he becomes disgruntled by one of his friends comments. He exerts a rightward force of 9.13 N on his 4.68-kg sled to accelerate it across the snow. If the acceleration of the sled is 0.815 m/s/s, then what is the coefficient of friction between the sled and the snow.

5. A 945-kg car makes a 180-degree turn with a speed of 10.0 m/s. The radius of the circle through which the car is turning is 25.0 m. Determine the force of friction and the coefficient of friction acting upon the car.

6. The coefficient of friction acting upon a 775-kg car is 0.850. The car is making a 180-degree turn around a curve with a radius of 35.0 m. Determine the maximum speed with which the car can make the turn.

7. A 1.50-kg bucket of water is tied by a rope and whirled in a circle with a radius of 1.00 m. At the top of the circular loop, the speed of the bucket is 4.00 m/s. Determine the acceleration, the net force and the individual force values when the bucket is at the top of the circular loop.