PHYSICS 141 **Name:**
Summer 2007
Sample Exam2

The multiple choice questions are 2 points each.

1. A sled is being dragged across a horizontal snow covered field with constant velocity. Which of the following is true

   a) There is not a single force acting on the sled that is doing work.
   b) There is not net work being done on the sled.
   c) The graviatational potential energy of the sled increases.
   d) The kinetic energy of the sled increases.

2. Work done by gravity is always

   a) Positive
   b) Negative
   c) Zero
   d) All of the above

3. Work done by static friction is

   a) Positive
   b) Negative
   c) Zero
   d) All of the above
   .

4. An object slides down a frictionless incline. Which of the following is true?

   a) The normal force is zero since it acts perpendicular to the displacement
   b) The work done by gravity is negative since the object comes down.
   c) The kinetic energy of the object increases on its way down.

5. Can the kinetic energy be ever negative? Explain.

6. Work is

   a) Scalar
   b) Vector because it is a dot product of two vectors.
   c) Can be both depending on the situation.

7. Force of static friction is

   a) always greater than force of kinetic friction
   b) greater than force of kinectic friction when it has its maximum value
   c) always less than force of kinetic friction
   d) always equal to force of kinetic friction

7. Which of the following is a vector quantity?
   a) Work b) Kinetic energy c) Potential energy d) Force

8. Work is negative anytime when

   a) The force is negative
   b) The displacement is negative
   c) The angle between the force and displacement is less than 90 degrees
   d) The angle between the force and displacement is more than 90 degrees

9. An object of mass m is moving in a circle of radius r with a velocity v. The work done by the centripetal force is
   a) positive b) zero c) negative d) depends on the situation

10. You are taking an "right exit" from a freeway and slowing down in the process

   a) The tangential acceleration acting on the car is in the direction of motion.
   b) The radial acceleration on the car is acting to the left at anytime
   d) The radial acceleration is zero.
   e) The radial acceleration of the car is acting to the right.

11. An object is sitting on the table and is at equilibrium. Which of the following is true?
   a) The normal force and gravity are a action and reaction pair.
   b) The normal force is greater than the weight of the object.
   c) The normal force is equal to the weight of the object

12. Which of the following is true for an object suspended from a vertical spring and at rest..
   a) The spring is un stretched in this position
   b) The spring force acts downward.
   c) The spring force is greater than the gravitational force
   d) The equilibrium position of this spring is not the un stretched position.

Problem # 2

5.44 This problem is based on 5.44

a) Draw the free body diagrams for all three objects (6 pts)

b) Find the acceleration of each object and their directions. (10pts)

c) Find the tensions in the strings (6pts)

d) If objects start from rest and travel for 2 seconds find their final speed and distance traveled. (6pts)_

Problem # 2
This problem has to do with 6.18
a) A 0.4 kg object is swung in a vertical circular path on a string 0.5 m long. If its speed is 4.00 m/s at the top of the circle, what is the tension when the object is at the top. Draw a free body diagram. (10 pts)

b) Consider a similar situation. If the speed is constant at 4.00 m/s (not easy to do) what are the tensions at the bottom of the circle and when the string is horizontal. Draw free body diagrams at these positions. (4+4+2+2)

c) What is the work done by tension when the speed is maintained constant. Why? (3)

Problem # 3.
This problem is based on problem # 8.33
a) Determine the change in block's kinetic enegy

b) The potential energy of the block at the top most point, relative to its starting point

c) The frictional force exerted on the block.

d) coefficient of friction

e) Is the block's energy conserved on its way to the top? Why?