Name _____ Date _____
Teacher _____ Period _____

Physics 1st Semester Final Exam SAMPLE Written Test

Answer all questions in the space provided. Show all work. NO CREDIT WILL BE GIVEN IF WORK IS NOT SHOWN.

1. A car with an initial speed of 12.6 m/s accelerating at a uniform rate for 5.6 s to a final speed of 24.8 m/s.
   a. What is the acceleration of the car? **($a = 2.18\ m/s^2$)**

   b. Over what distance does this acceleration occur? **(d= 104.7 m)**

2. A 0.150 kg marble moving 1.48 m/s rolls off the top edge of a 1.25 m high table.
   a. How long was it "in flight"? **(t= 0.505 s)**

   b. How far from the base of the table did it strike the floor? **(d= 0.748 m)**

   c. How fast was the marble traveling just before it hit the floor? **(v= -4.95 m/s)**

3. It takes a 15 N force to get a 3 kg plastic box moving across a wood floor. It only takes a 10 N force to keep the box moving at a constant speed. What is the coefficient of static friction and the coefficient of kinetic friction? **($\mu_S = .51$; $\mu_K = .34$)**

4. A 65 kg jogger runs at a constant speed of 7.0 m/s around a circular track of radius 47m.
   a. How long does it take the jogger to complete on loop? **(t= 42.2 s)**

   b. What is the joggers centripetal acceleration? **($a_c = 1.04\ m/s^2$)**

5. A 1350 kg car moving east at 7.5 m/s collides with a 2250 kg car moving east at an unknown speed. The cars stick together and move east as a unit after the collision at a speed of 5 m/s.
   a. Find the velocity of the 2250 kg car before the collision. **(v= 3.5 m/s)**

   b. What is the kinetic energy of the 1350 kg car before the collision? **(KE= 37969 J)**

6. Matthew pulls his little sister, Sarah, in a sled on an icy, horizontal surface (assume no friction), with a force of 60.0 N. The force is applied along a rope at an angle of 37.0^0 upward from the horizontal. If Matthew does 575 J of work how far did he pull his sister, Sarah? **(d= 12 m)**

7. Daisy uses a 1300 W motor to raise a 15.0 kg mass to an unknown height in 2.00 seconds.
   a. How much work did the motor do? **(W= 2600 J)**

   b. To what height was the mass raised? **(h= 17.7 m)**

   c. If Daisy wanted to raise the mass in 1.0 s instead of 2.0 s, how does the work and power change? **(W= 2600J; P= 2600 W)**

8. Bob wants to loosen a bolt that requires 45 N•m of torque. If his wrench is 0.25 m long, how much force must Bob apply? **(F= 180 N)**