Applied Physical Science Exam #2 Practice Name: _____

Section 1 – Definitions – Define each word or phrase (4 pts each)

1) Inertia

2) Terminal velocity

3) Weight

4) Vector

5) Force

Section 2 – Short Answer – Answer each of the following questions using complete sentences (4 pts each)

1) On Earth, a 6kg object weighs about 60N. On the Moon, how much would the object weigh? What would its mass be?

2) What is Newton's 2^{nd} Law? How are Newton's 1^{st} and 2^{nd} Laws related?

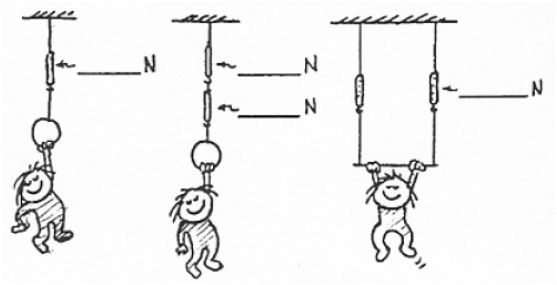
3) Explain why the vertical component of a projectile's velocity changes, while its horizontal component does not change.

4) What is the difference between an object's mass and its weight. Why is mass considered to be more fundamental than weight?

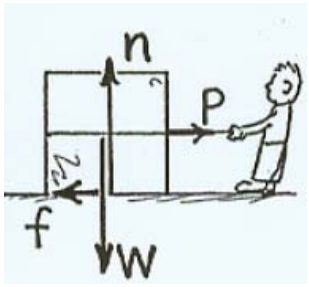
5) What is meant by "normal force?" How is it related to friction?

Section 3 – Short Problems – (4 pts each)

1) In the figure below, Little Nellie weighs 400N. Fill in the blanks.



2) In the figure below, little Newt pulls on a crate, but the crate doesn't move. How does Newt's pulling force, ***P***, compare to the friction force, ***f***?



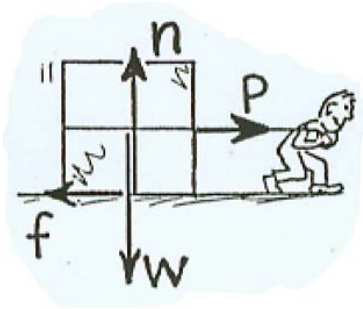
3) In the figure above, imagine Newt is pulling hard enough to slide the crate at a constant velocity of 1m/s across the floor. Compare forces ***P*** and ***f***.

4) In the figure above, imagine Newt is pulling hard enough to accelerate the crate to the right. Compare forces ***P*** and ***f***.

5) In the figure above, imagine Newt is pulling with a force of 200 newtons. The crate has a mass of 50kg, and the coefficient of static friction is 0.5. Does the crate slide? Explain.

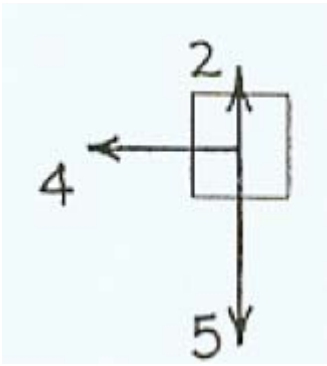
<u>Section 4 – More Problems</u> – Show your work clearly and completely. Be sure to include correct units in your answer where applicable. (4 pts each)

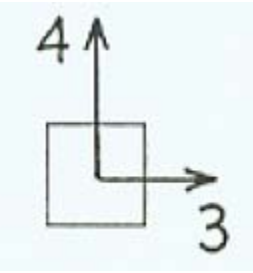
1) Newt pulls on a crate with a force of 300 newtons. The crate has a mass of 100kg, and the coefficient of kinetic friction is 0.2. Calculate the acceleration of the crate.



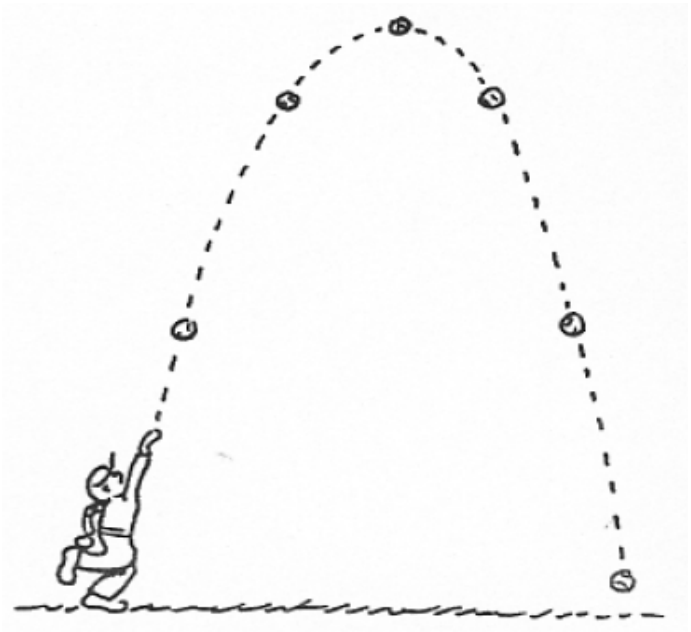
2) Using your answer to problem #1 above, calculate how long it will take Newt to move the crate a distance of 8 meters.

3) Find the resultant of these two vectors in each picture. Show how to use the parallelogram rule. Be sure to clearly indicate the resultant vector's magnitude and direction.

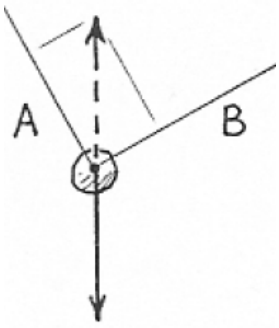




4) At each position of the projectile, draw a vector which represents the projectile's velocity. Then show the vertical and horizontal components of velocity at each position.

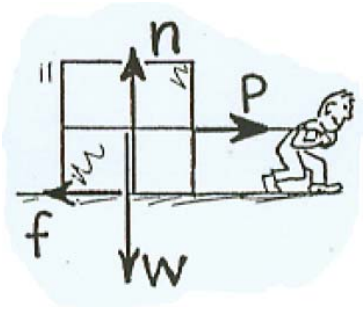


5) In the figure below, a rock is held at rest by two strings, A and B. In which string is the tension greater? Explain how you know this.



<u>Section 5 – Challenging Problems/Questions</u> – Show your work neatly and completely, including correct units where applicable. (10 pts. Each)

1) The block in the figure below has a mass of 10 kg. The coefficient of static friction between the incline and the block is 0.4. The coefficient of kinetic friction is 0.2. Calculate the acceleration of the block.



2) In each picture below, a rock is suspended by two strings, A and B. The rock is identical in each picture. In each picture, draw all force vectors that act on the rock, and use the parallelogram rule to determine in which picture the tension in the strings is greatest. ***Explain what, specifically, about your force diagrams gives you your answer.***