Physics 5 Test 1 Fall 2011 Name_____
Form A

Part 1 Scantron: Do all work for this part in the space provided on this form below each problem statement, or on pages 1, 2 and 3 of your scantron form. This work will **NOT** be graded. Only your answer on the scantron form will be checked as right or wrong. Do not use page 4 (the back side) for work for this part.

Part 2 HAND GRADED: Do this part on the back side (page 4) of the scantron form.

1. The property of an object at rest to remain at rest is known as
   a. inertness b. inertia c. resistance d. sluggishness

2. If an object moves in a straight line with a constant speed, we can conclude that
   a. the object has inertia. b. there are no forces acting on the object.
   c. there must be at least two forces acting on the object.
   d. there is no unbalanced force acting on the object.

3. If an object moves with a constant velocity, we can conclude that
   a. it is moving toward its natural place. b. there are no forces acting on it.
   c. there is no unbalanced (net) force acting on it. d. it has a very large inertia

4. What kind of motion does a constant, non-zero net force produce on an object of constant mass?
   a. constant speed b. constant acceleration c. increasing acceleration
   d. It depends on the speed of the object.

5. If you push on a railroad boxcar with a force of 200 N and it does not move, you can conclude that
   a. Newton's Second Law is not valid. b. This force is canceled by the Third Law force. c. The boxcar has too much mass to accelerate.
   d. There is a force of 200N in the opposite direction.

6. When the same net force is applied to two different colored blocks, the yellow one has a larger acceleration then the blue one. Which of the following is correct?
   a. The yellow block has the larger mass. b. The blue block has the larger mass.
   c. They have the same mass. d. The yellow block has a larger weight.

7. If $F_1$ is the force exerted on a cart by a horse and $F_2$ is the force exerted on the horse by the cart, then $F_1$ is_____$F_2$.
   a. much greater than b. slightly greater than c. equal to d. slightly less than

8. Which of the following is the Third Law force that accompanies the force that An apple exerts on a tree? It is the force that the
   a. earth exerts on the apple. b. apple exerts on the earth. c. the tree exerts on the apple. d. air exerts on the apple.

9. An object falling in a vacuum near the earth's surface has
   a. increasing velocity and increasing acceleration
   b. increasing velocity and constant acceleration
   c. increasing velocity and decreasing acceleration
   d. constant velocity and increasing acceleration
   e. constant velocity and constant acceleration

10. Two balls are dropped from the top of a tall tower. The second ball is dropped a fraction of a second after the first the first ball is released. As the balls accelerate to the ground at a constant acceleration of 9.80 $m/s^2$ the difference in their speeds
    a. remains constant b. decreases c. increases d. cannot be determined without knowing the exact time of delay

11. The reaction to the force of gravity is
    a. the weight of any object b. there is no reaction to the force of gravity
    c. the pull of any object on the earth

    Hannif accidentally drops his filled water bottle while rock climbing and it hits the ground at 90ft/s.
    Use this information to answer numbers 12 through 17.

12. Find the acceleration of the water bottle in $ft/s^2$ .
    a. 9.80 b. 32 b.16.0 c. 10.0 d. 4.90

13-14. Find the time in seconds that the water bottle is in the air.
    a. 2.81 b. 0.355 c. 9.18 d. 9.80

15-17. Find the distance in feet that Hannif is above the ground.
    a.127 b. 38.7 c. 45.0 d. 13.8 e. 253

    A Porsche accelerates from rest to 60mi/h in 4 seconds. Use this information to answer questions 18 through 25.

18-19. (This is a two point question). Find its acceleration in mi/h/s.
    a. 7.00 b. 15.0 c. 16.0 d. 30.0 e. 60.0

20-22. Find the acceleration in $ft/s^2$.
    a. 11.0 b. 10.2 c. 22.0 d. 44.0 e. 13.8

23-25. Find the distance traveled in feet during the four seconds.
    a. 176 b. 88.0 c. 44.0 d. 352 200

26. In the scientific method, which step comes first?
    a. develop a theory b. do an experiment c. observe nature
    d. develop a model e. predict behavior in a new situation

27. 123.2 $ft^3$ converts to how many cubic inches?
a. 1,478 b. 2,1290 c. 17, 7741 d. 212,900 e. none of these

28. Find the net force produced by a 6lb force acting north on a block and a 10lb force acting west.
a. 11.7 b. 136 c. 4.0 d. 23.4 e. none of these

29-32. Find the acceleration in $ft/s^2$ of a 6,500lb truck from rest if the engine exerts a force of 1,500lb and if air resistance exerts a force of 450lb.
a. 1.58 b. 7.39 c. 5.17 d.2.26 e. 10.3

33. Find the weight in dynes of a 35g object at the earth's surface.
a. 343 b. 343,000 c. 1,120 d. 34,300 e. none of these

34-35. A Mack truck and a Volkswagen traveling at the same speed have a head-on collision.
The vehicle to undergo the greatest change in velocity will be the
a. Volkswagen b. Mack truck c. both the same

36. Which of the following statements is correct?
a. 1kg cannot be compared to 2.2lb b. 1kg has a mass of 2.2lb
c. 1kg weighs 2.2lb d. 1kg equals 2.2lb e. none of these

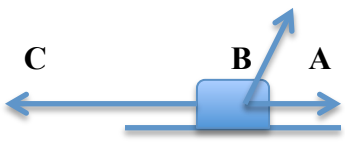
37. Two vectors **A** and **B** are added to form a vector **C.** The relationship between the magnitudes of the vectors is given by A+B=C. Which statement concerning these vectors is true?
a**. A** and **B** must be displacements b. **A** and **B** must have equal lengths
c. **A** and **B** must point in opposite directions
d. **A** and **B** must point in the same directions
e. **A** and **B** must be at right angles to each other

38-40. A 5N horizontal force, a 2N horizontal force and a 3N vertical force are applied to a 7kg block that is free to slide on a smooth horizontal surface, as shown to the right.
Find: the acceleration of the block in $m/s^2$ on the block.
a. 0.429 b. 0.857 c. 0.714 d. 1.00 e. none of these

**Part 2 Hand graded: Start all work for this part on page 4 of your scantron form. Be sure to show any working if applicable.**

**41.** (6 points) three forces are acting on the sketch shown to the right. Make a sketch to shown the net force (vector sum) on the object due to these three forces.

**R** = **A** + **B** + C



42.(4 points)Convert 174 square meters to square centimeters

43. (6 points)A car accelerates from 45 km/h to 95 km/h in 5 seconds
Find a. the acceleration in km/h/s
b. the acceleration in $m/s^2$
c. the distance traveled by the car

44. (4 points) Find the acceleration in $ft/s^2$ of a 1,500 lb car from rest, if the engine exerts a force of 2,000 lb and if air resistance exerts a force of 500lb.