University of Mississippi   Name: _____
PHYS 213 Sec 4, 19 Sep 2005

Test 1

Instructions:
Answer all of the following questions. You may use a calculator, but no book or notes. You may add more sheets if needed. Keep in mind: *What you write should be a readable, understandable explanation of how you arrive at each answer, as opposed to a statement of what the answer is*. This means:
— Write clear, well organized answers; Explain your answers to all questions.
— Start all calculations with the basic equation you use, and state briefly why it applies to the problem.
— Include only relevant equations and calculations (use separate sheets for other notes or attempts).
— Use different symbols for different quantities, and watch significant digits and units.

1. What is the difference between displacement and distance traveled? Can the displacement be greater than the distance covered? Can the distance covered be greater than the displacement? (10 pts.)

2. A projectile is thrown in the air vertically upward, rises up to a maximum height and falls back down to the ground. What is the value of its acceleration when it is at the topmost point of its path? (10 pts.)

3. Suppose you drop a bullet from your hand at the exact same time that you fire another bullet from a gun, horizontally from the same height. Which bullet reaches the ground first? (10 pts.)

4. What are mass and inertia? Are they related? (10 pts.)

5. A baseball pitcher throws a ball with a speed of 40 m/s, horizontally and with his hand 1.4 m above the ground in a perfectly flat field. Neglecting air resistance,

(a) How far from his feet does the ball hit the ground? [Hint: find the time it takes.] (10 pts.)

(b) What is its total velocity (magnitude and direction) when it hits the ground? (10 pts.)

6. A car is moving at a speed of 70 mph, and enters a stretch of wet road. The driver hits the brakes and locks the wheels, so the car starts to skid.

(a) What is the car's acceleration? The coefficient of static friction between the tires and the road is 0.60, and the coefficient of kinetic friction is 0.50. (10 pts.)

(b) How far does the car go before it comes to a stop? (10 pts.)

7. (a) A 2.30-kg box slides down a frictionless plane with a 25.0° slope. What is its acceleration? (10 pts.)

(b) For the box to be able to stay on the inclined plane without moving, what would the coefficient of static friction have to be? (10 pts.)