Physics 2311. Pinkney. Name: _____

Exam I Practice Questions.

1. A cell phone is dropped off of a 60-m high building We know that a=g=9.8 m/s^2 downward.

   (a) (1pt) Solve for the time it takes to hit the ground.

   (b) (1pt) How fast is it going just before the phone shatters?

2. (2pts) If the equation of motion of a "thingy" is $\vec{r}(t) = at^3\hat{i} + bt\hat{j} + ct^2\hat{k}$, then write an expression for:

   (a) (1pt) $\vec{v}(t) =$ _____

   (b) (1pt) $\vec{a}(t) =$ _____

3. (2 pts) Three seconds after being shot from ground level, a projectile is displaced 90 m horizontally and 50 m vertically above its starting point. What are the horizontal and vertical components of the initial velocity ($\vec{v_0}$) of the projectile?

4. (2 pts) Three strings exert forces on a frictionless dry ice block simultaneously. String 1 pulls the block towards $\theta = 300$ deg. String 2 pulls it towards $\theta = 210$ deg. String 3 pulls it towards $\theta = 120$ deg. Each string pulls with a force of 1 N. What is the net magnitude and direction of the force on the block? (Hint: draw the picture first!)

5. (1pt) An elevator with a mass of 1052 kg is supported by a steel cable. What is the tension in the cable when the elevator is being accelerated upward at a rate of 3.0 m/s^2? (g=9.8 m/s^2)

6. (2pt) A biker bikes around a circular track of radius 40 m at a constant speed. If she completes a lap in 15 seconds, what is her centripetal acceleration?

7. (1pt) An automobile moves on a level horizontal road in a circle of radius 25 m. The coefficient of friction between tires and road is 0.55. The maximum speed with which this car can round this curve (without slipping) is: