Circular Motion Review

1. Define or explain the following:
   a. Frequency

   b. Period

   c. Hertz

   d. Centripetal Force

   e. Centrifugal Force

2. Which of the following is NOT a property of Centripetal Force?
   a. It is unbalanced
   b. It always has a real source
   c. It is directed outward from the center of the circle
   d. Its magnitude is proportional to mass
   e. Its magnitude is proportional to the square of speed
   f. Its magnitude is inversely proportional to the radius of the circle
   g. It is the amount of force <u>required</u> to turn a particular object in a particular circle

3. If an object is swung by a string in a vertical circle, explain two reasons why the string is most likely to break at the bottom of the circle.

4. What is meant by the "critical velocity" for a particular circle? What is the critical velocity for a circle of radius 8 meters?

5. Draw a free-body diagram of a car driving over the top a circular "hump" in the road at the critical velocity for that "hump".

6. What provides the centripetal force for a car rounding a level curve? If the maximum coefficient of friction, μ, for a car on a level road is 0.9, what is the tightest curve the car can navigate at highway speed (~30 m/s)?

7. A 50 cm rope is used to twirl a 500 gram mass in a conical pendulum. If the period of the revolution is 1 second, what is the angle of the rope to the vertical? What is the tension in the rope?

8. Draw free-body diagrams of a person standing in the gondola of a constant-speed Ferris Wheel at the 12 o'clock, 3 o'clock and 6 o'clock positions. If the person feels as if she weighs 700 N at the bottom of the loop and 650 N at the 3 o'clock position, what would she feel her weight would be at the top of the wheel? What is her mass?

9. A25-cm-radius turntable spins at 45 rpm with a dime placed on the rim and NOT sliding off. What μ is required between the dime and the turntable? What is the linear speed of the dime?