**Physics 3204**

**Centripetal Force**

**Ensure that you draw completed diagrams and list all givens for each problem.**

1. How fast must a plane be flying in a loop-the-loop of radius 2.0 km if the pilot feels weightless? (There is no normal force from the seat)

2. A string used to make a pendulum has a breaking strength of 12.0 N and a length of 0.80 m. A 1.00 kg bob is set in motion.

a) If the bob moves with a speed of 1.00 m/s at the bottom will the string break?

b) What is the highest speed the bob can move at (critical speed)

3. A 1.5 kg object is swinging from the end of a 0.62 m string in a vertical circle. If the period is 1.2 s, what is the max and min tension in the cord?

4. A 2.0 g raisin is sitting on a turntable. What is the frictional force that must be provided to keep the raison on the turntable if it spins at 45 rpm at a radius of 3.0 cm?

5. A car goes around a banked curve at an angle of 30°. The car will stay on the road with no friction at a speed of 22.0 m/s. What is the radius of the curve?

6. Calculate the angle at which you must bank a frictionless curve such that a car can round it safely at 100.0 km/hr if the radius of the curve is 500.0 m.

7. What is the max speed at which a car can still stay on a racetrack banked at 30° if the radius of the track is 0.800 km?