Year 11 Physics
Uniform Circular Motion Assignment

1.
 a) State the name for the acceleration that leads to circular motion.   /1
 b) Describe the direction of the acceleration during circular motion.   /2
 c) Explain whether or not an object in uniform circular motion has a constant velocity.   /2

2. A car moves around a circular bend in a flat road at a constant speed. State and explain how much the acceleration of the car changes by if the following occur:
 a) the speed of the car doubles,   /2
 b) the radius of the bend is halved,   /2
 c) the car hits an oil slick.   /2

3. A model train has a mass of 0.60 kg and is moving around a circular track of radius 2.4m with a constant speed of 0.6 ms^{-1}.
 a) Calculate the acceleration of the train.   /3
 b) Calculate the force on the train.   /3

4. A rock of mass 4.0 kg is attached to a wire and is whirled in a circle of radius 0.40 m with constant speed. The tension in the wire is 80N.
 a) Calculate the acceleration of the rock.   /3
 b) Calculate the speed of the rock.   /2
 c) Calculate the period of motion of the rock.   /2
 d) Calculate the number of revolutions the rock makes in 3.5 seconds.   /2

5. A car of mass 1100 kg goes around a banked track of radius 600 m at a constant speed of 60 ms^{-1}
 a) Calculate the banking angle if the car negotiates the bend with no reliance on friction.   /2
 b) Calculate the magnitude of the centripetal acceleration of the car as it goes around the bend.
                                                                                          /2

6. A surveying satellite is orbiting the planet Botany in the Eosi Sector.
 a) Identify the force causing the centripetal acceleration.   /1
 b) The satellite is pulling the planet. Explain using one of Newton's laws.   /2
 c) Compare the force on the planet with the force on the satellite. Compare the movement of the planet to the movement of the satellite, and explain.   /2

                                                              TOTAL   /35