**Circular Motion**

1. Centripetal force is a) directly proportional to the radius of the circular path of the object b) directly proportional to the mass of the object c) inversely proportional to the velocity of the object d) inversely proportional to the square of the velocity
2. What provides the centripetal force in each case below?
3. A car rounding a curve
4. The moon orbiting the earth
5. A passenger in a car rounding a curve?
6. A horizontal force of 280N is exerted on a 2.0kg discus as it is rotated uniformly in a horizontal circle of radius 1.00m. Calculate the velocity of the discus.
7. A 0.40kg ball attached to the end of a horizontal cord, is rotated in a circle of radius 1.3 m on a frictionless surface. If the cord will break when the tension exceeds 60N, what is the maximum speed the ball can have? How would your answer be affected if there were friction?
8. What is the maximum speed with which a 1050 kg car can round a turn of radius 70m on a flat road if the coefficient of friction between the tires and the road is 0.80? How would the answer be affected if it were a 2500 kg truck instead?
9. A 1300 kg car traveling at 50km/hr rounds a flat curve of radium 200 m. What is the minimum coefficient of friction between the tires and road needed so that the car can round the curve safely?
10. A ball on the end of a string is revolved at a uniform rate in a vertical circle of radius 85.0 cm. If its speed is 4.15m/s and its mass is 0.300 kg, calculate the tension on the cord at
11. the top of its path b) the bottom of its path
12. At what minimum speed must a roller coaster be traveling when upside down at the top of a 8.6m loop if the passengers are not to fall out?
13. A 1000kg car moves at 20m/s across the top of a rounded hill (radius 100m)
14. Determine the normal force on the car
15. Determine the speed above which the car will fly off the hill
16. A roller coaster traveling at 22 m/s is to round a banked curve of radius 50m. What angle should the curve be banked in order to assure that the coaster will make the curve?
17. A 1200 kg car rounds a curve of radius 70m banked at an angle of 12o. If the car is traveling at 90km/hr, how much frictional force will be required?