

1. A ball of mass 0.05 kg is attached to a string of length 0.75 m . The mass moves in a circle and completes one revolution in 0.2 s .
 - (a) Determine the speed with which the ball moves.

 - (b) Determine the centripetal acceleration experienced by the ball.

 - (c) Determine the tension in the string.

 - (d) How would the tension in the string change if the time period is reduced to half its original value?

2. A vehicle of mass 1500 kg is making a turn of radius 50 m . The coefficient of static friction between the tires and the road is 0.8 .
 - (a) Determine the maximum speed in m/s and $miles/hour$ that this vehicle can travel to negotiate the turn safely.

 - (b) How would the maximum speed change under icy conditions when the coefficient of static friction changes to 0.1 .

3. A satellite of mass 2000 kg is placed in a circular orbit of radius 7×10^7 above the Earth. The mass of the earth is $5.98 \times 10^{24} \text{ kg}$ and the $G = 6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$.
- (a) Determine the speed of the satellite.

(b) Determine the time period of the satellite.

4. The time period of a GEOSTATIONARY satellite in a circular orbit around the Earth is 24 hours . Determine the radius of it's orbit. The mass of the earth is $5.98 \times 10^{24} \text{ kg}$ and the $G = 6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$.