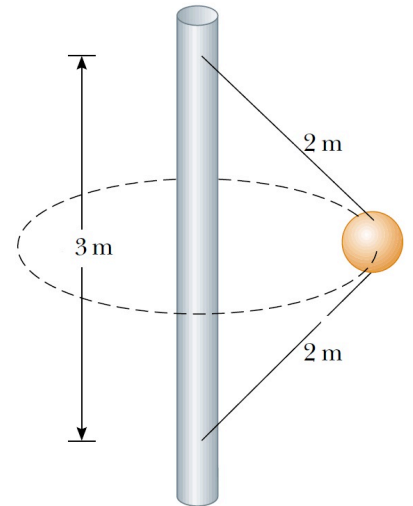


RECITATION 5

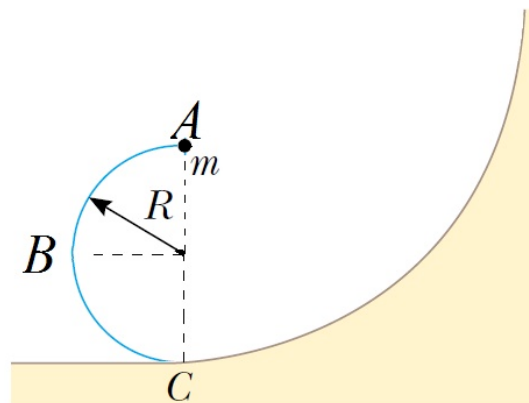
1) A car entering a circular path of radius 200 m increases its speed uniformly from 72 km/h to 108 km/h in a distance of 150 m . Find the tangential, radial and total acceleration of the car after it has traveled 100 m in the circular path.

2) An amusement park ride consists of a vertical cylinder that spins about its axis fast enough such that any person inside is held up against the wall when the floor drops away. The coefficient of static friction between person and wall is 0.3 , and the diameter of the cylinder is 5 m . Find the frequency of the cylinder when a person of mass 60 kg is inside.

3) A 4 kg object is attached to a vertical rod by two strings, as in the figure. The object rotates in a horizontal circle at constant speed 6 m/s . Find the tension in the strings.



- 4) An object of mass m is released from rest at the point A . Find:
- The resultant force acting on the object at the point B ,
 - The resultant force acting on the object at the point C ,
 - The highest point that the object can reach.



5) A block of mass 0.5 kg is pushed against a horizontal spring of negligible mass until the spring is compressed a distance x as shown in figure. When it is released, the block travels along a frictionless, horizontal surface to point B , the bottom of a vertical circular track of radius $R = 1 \text{ m}$, and continues to move up the track. The speed of the block at the bottom of the track is $v_B = 12 \text{ m/s}$, and the block experiences an average friction force of 7 N while sliding up the track.

- What is x ?
- What is the speed of the block at the top of the track?
- Does the block actually reach the top of the track, or does it fall off before reaching the top?

