Uniform Circular Motion, Featuring 2D.

1. A 225g mass swings in a horizontal circle, suspended from the ceiling by a 1.0m string. If the angle between the string and the ceiling is 58o, what is the speed of the mass?

2. At what speed would the mass in question 1 need to move for the angle to become 43o?

3. A car travels around a circular corner banked at 12o. Due to a series of unfortunate prior events including, but not limited to, a severe winter storm, an accident resulting in a truck carrying a load of sesame oil overturning and losing its load, compounded by poor planning and a lack of forethought on the part of the car’s driver exacerbated by her financial constraints leading to very bald tires on the car, the coefficient of friction between the bald tires and the icy, oily and deliciously fragrant road surface is negligible. If the radius of the corner is 44m, at what speed must the car travel to make the turn safely?

4. A 225kg roller coaster car experiences an 865N *downward* normal force as it passes the highest point in a loop-de-loop. If the radius of the loop is 5.0m, find the speed of the cart.

5. A 340g toy plane swings in a horizontal circular path, fixed to the ceiling by a 1.20m long string. If the string makes a 28o angle with respect to vertical, how much time does it take for the plane to complete one revolution?

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6. A highway engineer needs to determine the correct posted speed for a corner on a highway. The corner has a radius of 98.6m and is banked at 12.0o. The assumed coefficient of friction between tires and the road surface is 0.600. The engineer needs to post a speed that is 60.0% of the maximum safe speed. What should the posted speed be for this corner?

Good Text Questions: Chapter 5 Conceptual Questions: 1, 3, 5, 7, 15

 Chapter 5 Problems: 5, 9, 16, 20, 23, 26, 30

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