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Welcome back, Bill Wiecking

>>Working in AP Physics B (SC651)

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ch 9 exam

Chapter 9: Uniform Circular Motion

Conceptual problems

9.C.2
(10.00) Health professionals use a device called a centrifuge to separate the different components of blood. If you allow a sample to sit long enough, Earth's gravity will cause it to separate on its own. This happens because the liquids and solids in blood have different densities. The denser solids sink to the bottom of a test tube, while less dense liquids rise to the top. To speed up the process of separation, a centrifuge spins blood sample tubes at high speeds in uniform circular motion. How does the spinning of the centrifuge speed up the separation process?

Section 4: Centripetal acceleration

9.4.2
(7.00) In a carnival ride, passengers are rotated at a constant speed in a seat at the end of a long horizontal arm. The arm is 8.30 m long, and the period of rotation is 4.00 s. (a) What is the magnitude of the centripetal acceleration experienced by a rider? (b) State the acceleration in "gee's," that is, as a multiple of the gravitational acceleration constant g.

(a) [   ] m/s^2

(b) [   ] g

9.4.6
(10.00) You tie a string to a rock and twirl it at a constant speed in a horizontal circle with a radius of 1.30 m, 2.10 m above the ground. The rock comes loose and travels as a projectile a horizontal distance of 9.40 m before striking the ground. (a) What was the magnitude of the centripetal acceleration of the rock when it was on the string? (b) What was its speed when it was on the string?

(a) [   ] m/s^2

(b) [   ] m/s

Section 6: Newton's second law and centripetal forces

9.6.4
(7.00)
Fifteen clowns are late to a party. They jump into their sporty coupe and start driving. Eventually they come to a level curve, with a radius of r meters. What is the top speed at which they can drive successfully around the curve? The coefficient of static friction between the car's tires and the road is 0.800.

[ ] m/s

Section 7: Sample problem: banked curves

9.7.4
(7.00)
A jet of mass 9.7×10^4 kg makes a horizontal circular turn and "banks" or tilts its wings as it does so. The turn is 1200 m in radius and the jet has a constant speed of 160 m/s. The lift created by the plane's wings is perpendicular to the wing surface. (a) What is the magnitude of the lift force on the wings? (b) What is the angle of the lift force with respect to the horizontal?

(a) [ ] N
(b) [ ] °

Section 11: Loop-the-loop

9.11.3
(5.00)
A road has a hill with a top in the shape of a circular arc of radius 32.0 m. How fast can a car go over the top of the hill without losing contact with the ground?

[ ] m/s

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