Name _____ Regents Physics

Circular Motion Lab

Directions: In this lab you will determine the tangential velocity and acceleration of a stopper swinging in a circular motion attached to a string of measured length. You will also calculate the force tension in the string.

Materials

- Circular Motion Kit

Procedure

- Measure out a length of rope and tie the stopper to one end
- Swing the stopper around on the string and have a partner use the stopwatch to record the period
- You will have to experiment to obtain useable results…so practice and record your best (3) trials!
- Record your results in the table below and calculate the tangential velocity, centripetal acceleration and force tension in the string.
- Complete the regents questions attached to this lab

Trial	Length of string (r)	Period (T)	Velocity (v)	Acceleration (a_c)	Force Tension (F_T)
1					
2					
3					

Calculations for velocity

Calculations for acceleration

Calculation for Force Tension

What happens if you allow the string to slip out of your hand and become longer while you are performing the experiment.

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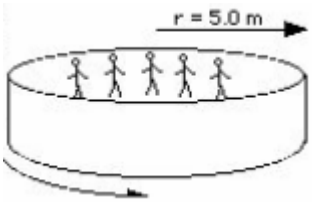
_____

Free Response Problem: Show all work in the spaces provided.



In an amusement park, there is a ride called the “Devils Hole”. The ride is basically a big barrel that spins very rapidly. The riders rest standing up against the barrel’s wall. While spinning, the floor drops down while the riders are held in place. For a 75 kg rider, calculate:

A) If the barrel makes 2 revolutions every 2.9 seconds, what is the tangential velocity?

B) What is the centripetal acceleration?

C) How much centripetal force is exerted on the rider?

D) How many g forces is this? (hint..your weight is 1 g force, for example, a 600-N person experiences 1 g. If the rider experienced a 1200-N force, this would be a 2g force)