Centripetal Force Lab

Name_____

Purpose: This lab shall demonstrate the relationship between force, string length and speed in a circularly moving object.

Formulas: $F_c = mv^2/r$ $C = 2 \pi r$

Materials: Glass tube, Thread, Stopper (2 hole), Masking tape, Masses (100 g & 200 g), Stopwatch

Procedure: Set up apparatus as shown in class. Time ten periods of circular motion with your thread radius set at a 50 cm length and a 101 g mass providing the Fc. Repeat using a 100 cm length. Time a third time with a 201 g mass. Clean up area and equipment, THEN do calculations!

Data:

Setup	Stopper Mass (m)	Hanging Mass	String Length (r)	Time (10 cycles)
1		.101 kg	.50 m	
2		.101 kg	1.00 m	
3		.201 kg	1.00 m	

Calculations:

Setup	Period (T)	Circumference	Speed (v)	Calculated F_c	Actual F_c
1	s	m	m/s	N	N
2	s	m	m/s	N	N
3	s	m	m/s	N	N

Conclusions:

1. What provides the actual centripetal force?

2. How does the length of the string affect the Fc, and why?

3. Why does the increased Fc result in an increased speed?

4. What were your % errors for trials 1-3?

5. If we used the 100 cm string length and the stopper was spinning at 5.83 m/s, what mass was hanging on the hook?