Circular Motion Data – 2020

Part 1

Measure the mass of the brass hexagon M that we will use to hang off the pulley. This will produce the tension force F­­­T = Mg that will be equivalent to the centripetal force Fc in the rotating platform portion of the lab.

M = 85.9 g

δM = 0.1 g

Find FT ± δFT

Part 2

(This is just a summary of the steps to give some additional context to the data. Full instructions are given in the lab writeup and during our lab)

Start with platform stationary. Hang the brass hexagon off of the string attached to the brass hooked cylinder (BHC). Adjust sidepost until BHC is hanging vertically, then adjust the pink indicator disk bracket until the pink indicator is within the bracket. Remove the brass hexagon which will take the BHC out of vertical alignment. Rotate the platform until the pink indicator disk is back into the bracket. This tells you that you are applying the same force through rotation (centripetal force) that you had when the brass hexagon was hanging off of the BHC.

Record the time it takes for 10 rotations. Do 5 trials. Then hang the brass hexagon off again while switching the BHC to a different loop. Re-align vertically and record this new radius. Repeat for a total of four loops.

Mass of BHC: m = 208.3 g

δm = 0.1 g

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Radius (cm) | 20.6 | 18.7 | 16.4 | 15.1 |
| Time for 10 rev (s) trial 1 = t1 | 14.19 | 13.61 | 12.62 | 12.14 |
| Trial 2 (s) = t2 | 14.45 | 13.59 | 12.47 | 12.28 |
| Trial 3 (s) = t3 | 14.2 | 13.47 | 12.42 | 12.43 |
| Trial 4 (s) = t4 | 14.21 | 13.66 | 12.88 | 12.23 |
| Trial 5 (s) = t5 | 14.19 | 13.67 | 12.23 | 12.28 |

Calc T, the period for one revolution, from averaging the above data

Find δt for each of the t1 through t5 from σ/sqrt(N)

Find δT for each of the trials from δT = δt/10 (where 10 is the number of revolutions that happened in time t)

Find δT2 from rule 2

Plot T2 on the y axis and r on the x axis.

Use your slope to solve for ΣFC

Use rule 4 to find δFC