Physics 1100

Linear Motion and One-Dimensional Kinematics

The first part of the lab requires two runs. One with our cart traveling from the left to right, then another run with the cart traveling from right to left. In both cases, the track is level. Our data consists of a single run (were the cart makes its way across the track, collides with the edge, then reverses direction and returns). Presented here are two tables of data (obtained from our single run). Table 1 is a portion of the data taken in one direction while table 2 is a portion of the data taken in the other direction.

In the lab manual, the equipment they used only allows for six data points (there are only six photo-gate timers). If their procedure is to be used, one may choose to use any of the six data points to represent the position of a timer along with the time it would have displayed.

Data From Cart Moving Left To Right	
Position (m)	**Time (s)**
0.2097	0.850
0.2555	0.900
0.3017	0.950
0.3474	1.000
0.3930	1.050
0.4385	1.100
0.4838	1.150
0.5289	1.200
0.5738	1.250
0.6187	1.300
0.6631	1.350
0.7077	1.400
0.7518	1.450
0.7958	1.500
0.8396	1.550

Table 1. *A selection of data which your lab manual requires for 'their' run #1.*

Data From Cart Moving Right To Left	
Position (m)	**Time (s)**
0.8924	1.750
0.8585	1.800
0.8213	1.850
0.7859	1.900
0.7513	1.950
0.7158	2.000
0.6800	2.050
0.6457	2.100
0.6116	2.150
0.5768	2.200
0.5426	2.250
0.5091	2.300
0.4751	2.350
0.4416	2.400
0.4087	2.450

Table 2. *A selection of data which your lab manual requires for 'their' run #2.*

The second part of the lab also requires two runs. After elevating one side of the track data is to be collected; once with the rider released from the top, and another after given a push from below to make its way up the track. Again, our data is from a single run that underwent both motions. With the right edge elevated, our cart was placed on the bottom of the track (left side). It was then given a push so that it made its way up the track to eventually lose speed and return to the bottom. Table 3 contains a portion of the data as the cart made its way up the track while Table 4 can be used to analyze the cart's motion on its way down.

Data From Cart Moving Left To Right	
Position (m)	**Time (s)**
0.2028	0.080
0.2270	0.120
0.2500	0.160
0.2716	0.200
0.2919	0.240
0.3109	0.280
0.3286	0.320
0.3449	0.360
0.3598	0.400
0.3735	0.440
0.3859	0.480
0.3968	0.520
0.4066	0.560
0.4151	0.600
0.4221	0.640

Table 3. *Data collected as the cart traveled upwards.*

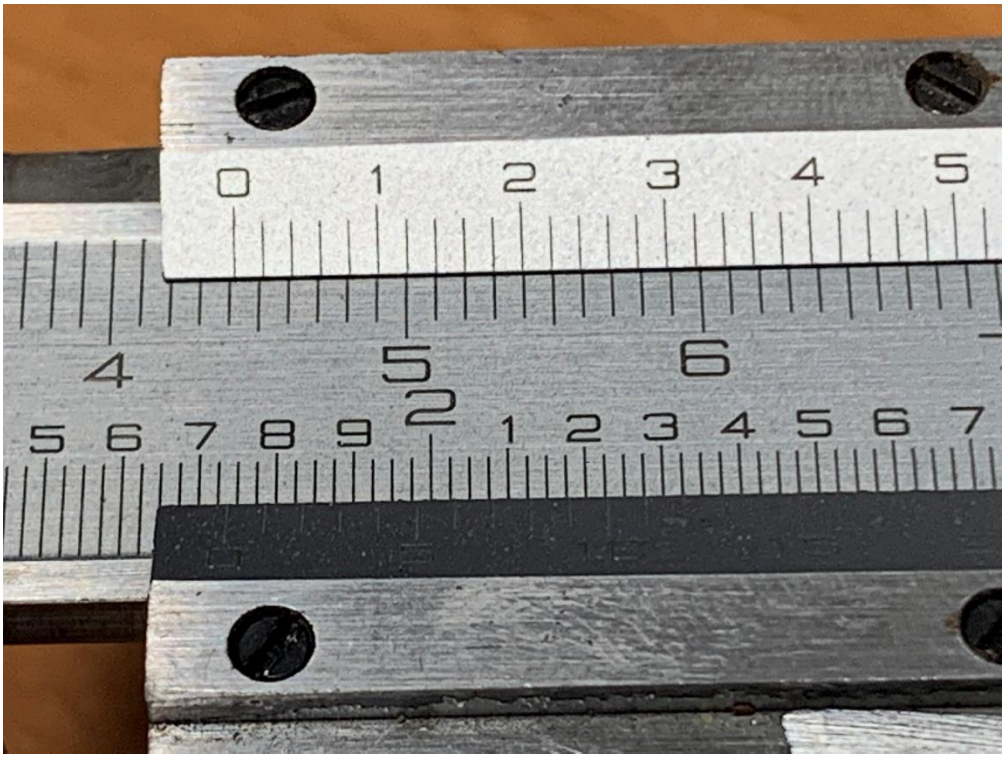
Data From Cart Moving Right To Left	
Position (m)	**Time (s)**
0.3776	1.240
0.3650	1.280
0.3512	1.320
0.3363	1.360
0.3201	1.400
0.3028	1.440
0.2842	1.480
0.2645	1.520
0.2437	1.560
0.2220	1.600
0.1991	1.640
0.1750	1.680
0.1499	1.720
0.1237	1.760
0.0964	1.800

Table 4. *Data collected as the cart traveled downwards.*

The following photos can be used to determine the slope of our track.

Two identical risers were used to elevate the track. *One* riser underneath each foot. Here is a photo of one of the risers in the jaws of a vernier caliper.

Here is a close up on the caliper's movable scale.



Here is a photo taken of the insert for the track's left foot. The camera lens is positioned directly above the left side of the hole. A meter stick was used so those numbers are in units of cm.

Here is a photo taken of the insert for the track's *right* foot. The camera lens is positioned directly above the left side of the hole.