Physics 11422 Laboratory Report

Student name Section: _____

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1 Question and model

How does the acceleration of a cart change when the net force is varied? For constant mass, Newton's second law predicts

$$a = \frac{F_{\text{net}}}{m}.$$

State the measurable variables and the assumptions behind this model.

2 Apparatus and procedure

List the cart, track, motion sensor, masses, and data-acquisition settings. Describe the alignment, calibration, number of trials, and the procedure used to reject or repeat a measurement.

3 Data

Table 1: Example data table; replace the values and add rows as needed.

F_{net} (N)	a ($\mathrm{m\,s^{-2}}$)	σ_a ($\mathrm{m\,s^{-2}}$)
0.20	0.39	0.03
0.40	0.81	0.04
0.60	1.18	0.05
0.80	1.62	0.06

4 Analysis

Plot acceleration against force, fit a straight line, and interpret the slope and intercept. Propagate the uncertainty in the slope and compare the inferred mass with the independently measured mass. Discuss friction, sensor lag, and track tilt as possible systematic effects.

5 Conclusion

State whether the data support the model within uncertainty. Include the final quantity with units and uncertainty, then name the most useful improvement.