### Part I – Design and Construction of the Experiment (66 pts)

**A. Statement of the Problem (2 pts)**
- **2 1 0** Statement addresses the experiment including variables (Not a yes/no question)

**B. Hypothesis (6 pts)**
- **2 1 0** Statement predicts a relationship between the independent and dependent variables
- **2 1 0** Statement gives specific direction to the prediction(s) (i.e., a stand is taken)
- **2 1 0** A rationale is given for the hypothesis.

**C. Variables (20 pts)**

- **a. Independent (IV) & Dependent (DV) Variable (12 pts)**
  - **4 3 2 1 0** IV Correctly identified and defined
  - **4 3 2 1 0** Levels of IV given

- **b. Controlled Variables (CV) & Constants (8 pts)**
  - **2 1 0** First CV correctly identified
  - **2 1 0** Second CV correctly identified
  - **2 1 0** First Constant correctly identified
  - **2 1 0** Second Constant correctly identified

**D. Experimental Control (Standard of Comparison) (4 pts)**
- **2 1 0** SOC logically identified for the experiment
- **2 1 0** Reason given for selection of SOC

**E. Materials (4 pts)**
- **2 1 0** All materials are listed and quantified
- **2 1 0** No extra materials are listed

**F. Procedure and Set-up Diagrams (14 pts)**
- **2 1 0** Procedure is presented in list form
- **2 1 0** Procedure is in a logical sequence
- **2 1 0** Steps for repeated trials are included
- **2 1 0** Multiple diagrams of setup are provided
- **2 1 0** All diagrams are appropriately labeled
- **4 3 2 1 0** Procedure detailed enough to repeat experiment accurately

**G. Qualitative Observations (6 pts)**
- **2 1 0** Observations about procedure provided
- **2 1 0** Observations about the results provided
- **2 1 0** Observations given throughout the course of the experiment

**H. Quantitative Data - Data Table (10 pts)**
- **2 1 0** All raw data is provided
- **2 1 0** Condensed data table with only the data to be graphed is provided
- **2 1 0** All data has units
- **2 1 0** Example calculations for derived variables are given

### Part II – Data, Analysis and Conclusions (94 pts)

**I. Graph (12 pts)**
- **4 3 2 1 0** Appropriate Graph is provided
- **4 3 2 1 0** Graph properly titled and labeled
- **4 3 2 1 0** Appropriate scale and units included

**J. Statistics (14 pts)**
- **4 3 2 1 0** Statistics of Central Tendency used (i.e., best fit, median, mode, mean)
- **4 3 2 1 0** One example calculation is given for each statistic with units
- **4 3 2 1 0** Statistics of variation are included (i.e., minimum, maximum, range, standard deviation)
- **2 1 0** Calculations are accurate

**K. Significant Figures (12 pts)**
- **4 3 2 1 0** Data is reported using correct significant figures
- **4 3 2 1 0** Graph completed using correct significant figures
- **4 3 2 1 0** Statistics are reported using correct significant figures

**L. Analysis of Claim/Evidence/Reason (CER) (18 pts)**
- **2 1 0** Statistics Claim completed logically
- **2 1 0** Statistics Evidence completed logically
- **2 1 0** Statistics Reasoning completed logically
- **2 1 0** Outliers Claim completed logically
- **2 1 0** Outliers Evidence completed logically
- **2 1 0** Outliers Reasoning completed logically
- **2 1 0** Data Trend Claim completed logically
- **2 1 0** Data Trend Evidence completed logically
- **2 1 0** Data Trend Reasoning completed logically

**M. Possible Experimental Errors (8 pts)**
- **4 3 2 1 0** One specific error is identified and effect on results discussed.
- **4 3 2 1 0** Second specific error is identified and effect on results discussed.

**N. Conclusion (8 pts)**
- **2 1 0** Hypothesis is re-stated
- **2 1 0** Hypothesis Claim completed logically
- **2 1 0** Hypothesis Evidence completed logically
- **2 1 0** Hypothesis Reasoning completed logically

**O. Applications & Recommendations for Further Use (6 pts)**
- **2 1 0** Suggestions to improve the experiment given
- **2 1 0** Suggestions for practical applications of experiment are given
- **2 1 0** Suggestions for future experiments are given

***Continued on back***
P. Abstract (16 pts)

Brief and well-organized
Contains the Statement of the
Problem and Hypothesis
Describes the research procedure
Includes major findings and conclusion

School: ____________________________ Team# __________

Point Total: _______/160

Deduction multiplier(s):
Non-clean up (0.95), Off topic (0.75), or Non-lab (0.25)

Final Score: ________________