**Lab Skills and Performance \_\_\_\_\_/ 3**

|  |  |  |
| --- | --- | --- |
| **C** | **P** | *Note: C = Complete, 1 pt; P = Partial, 0.5 pt.* |
|  |  | Follows instructions accurately, adapting to new circumstances (seeking assistance when required) |
|  |  | Competent and methodical in the use of a range of techniques and equipment |
|  |  | Pays attention to safety issues |

**Logistics/Final Draft Quality \_\_\_\_\_ / 5.5**

|  |  |  |  |
| --- | --- | --- | --- |
| **C** | **P** | **N** | *Note: C = Complete, 0.5 pt; P = Partial, 0.25 pt., N = Not at All = 0 pt.* |
|  |  |  | Lab is fully typed  |
|  |  |  | Lab includes a heading in the upper left-hand corner that includes: your name, the date the lab was turned in, your class period (and partner name(s) if applicable) |
|  |  |  | The appropriate title of your lab (i.e. it matches, or is extremely close to, the title given in class) is included as a document title—distinct, centered, and either bold or underlined |
|  |  |  | Your lab is presented in a proper, clear order  |
|  |  |  | No single data table carries over onto a second page without proper notation and labels |
|  |  |  | Data tables, figures, and graphs are each numbered sequentially |
|  |  |  | Data tables, figures each have a proper, descriptive title and/or caption |
|  |  |  | All tables, figures, and graphs are inserted properly into a single Word document |
|  |  |  | The raw and processed data tables are all clear and easy to interpret—proper gridlines; legible font size; organized clearly. |
|  |  |  | The orientation of all pages of the lab report is consistently in the portrait orientation |
|  |  |  | Lab was turned in to [www.turnitin.com](http://www.turnitin.com) on time and in a proper file format that can be opened and read. |

**Analysis Aspect 1: Raw Data:** *“The report includes sufficient relevant quantitative and qualitative raw data that could support a detailed and valid conclusion to the research question”* ***\_\_\_\_\_\_ / 3 raw 🡪 \_\_\_\_\_ / 6 IB***

|  |  |  |  |
| --- | --- | --- | --- |
| **C** | **P** | **N** | *Note: C = Complete, 0.5 pt; P = Partial, 0.25 pt., N = Not at All = 0 pt.* |
|  |  |  | Single measurements that are supplemental (i.e. those related to controlled variables, not the MV or RV) have been recorded clearly and with proper units |
|  |  |  | Column headings for all variables include proper label and units |
|  |  |  | An appropriate number of manipulations have been recorded for the manipulated variable |
|  |  |  | An appropriate number of trials have been recorded for both the manipulated and the responding variables |
|  |  |  | There are only measured pieces of data, no calculations at all, reported in the raw data |
|  |  |  | Measured pieces of data are reported to an appropriate number of significant figures/appropriate precision |

**Analysis Aspect 2: Data Processing** *“Appropriate and sufficient data processing is carried out with the accuracy”* ***\_\_\_ / 5.5(7.5) raw 🡪 \_\_\_ / 6 IB***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **C** | **P** | **N** | *N/A* | *Note: C = Complete, 0.5 pt; P = Partial, 0.25 pt., N = Not at All = 0 pt.* |
|  |  |  |  | Column headings for all variables include proper label and units |
|  |  |  |  | At least 1 complete sample calculation is included for every individual type of calculation used during processing |
|  |  |  |  | All values that needed to be processed have been processed (and no extraneous/unnecessary data was processed) |
|  |  |  |  | All processing, as shown in the sample calculations, was completed **correctly**  |
|  |  |  |  | All processing, as shown in the sample calculations, was reported completely—clear/thorough work shown |
|  |  |  |  | Sample calculations are immediately after the table in which the data is reported |
|  |  |  |  | A graph is included, using proper data in order to show the relationship between the MV and RV |
|  |  |  |  | The MV and RV have been plotted on their appropriate axis |
|  |  |  |  | The proper fit line(curve) has been applied to the data in the graph |
|  |  |  |  | A statement is made after the initial graph stating the relationship between the MV and the RV (not necessary if linear) |
|  |  |  |  | If the initial graph is not linear, sample calculations for and a data table showing the mathematical manipulation done to one of the axes of data is included |
|  |  |  |  | If the initial graph is not linear, the **correct** manipulation of your values has been calculated (and corresponds to the curve-fit of your initial data) |
|  |  |  |  | If the initial graph is not linear, a second graph, using your new calculated values, is included |
|  |  |  |  | Each graph has an appropriate title, has appropriate labels on each axis, and has no “extra” or unused space in the graph |
|  |  |  |  | Each graph contains point protectors (point symbols), but no “connecting lines” |

**Analysis Aspect 3: Impact of Uncertainty:** *“The report shows evidence of full and appropriate consideration of the impact of measurement uncertainty on the analysis.”* ***\_\_\_\_\_\_ / 6 raw 🡪 \_\_\_\_\_ / 6 IB***

|  |  |  |  |
| --- | --- | --- | --- |
| **C** | **P** | **N** | *Note: C = Complete, 0.5 pt; P = Partial, 0.25 pt., N = Not at All = 0 pt.* |
|  |  |  | Appropriate absolute uncertainties have been reported clearly for each measured variable associated with the MV |
|  |  |  | Appropriate absolute uncertainties have been reported clearly for each measured variable associated with the RV |
|  |  |  | Appropriate absolute uncertainties have been reported clearly for each stated CV |
|  |  |  | Under the raw data table(s), statements justifying the uncertainties that were used have been reported |
|  |  |  | The statements justifying the uncertainties that were used are clear, logical, and thorough |
|  |  |  | The precision of the measured data agrees with the precision of the uncertainties that were reported |
|  |  |  | All averaged data includes properly calculated uncertainties (if different, should be in a separate, but adjacent, column) |
|  |  |  | Other processed data also includes correcly calculated uncertainties, reported in a proper way and in a column adjacent to the column in which the data is reported. |
|  |  |  | Sample calculations for each error propagation used have been shown thoroughly and clearly |
|  |  |  | Uncertainties are reported properly in graph(s) as error bars. If the error bars are too small to be visible, a statement explaining this has been included under the graph. |
|  |  |  | Max and Min slopes have been included on the final linear graph |
|  |  |  | Max and min slopes are inserted appropriately for the reported uncertainties/error bars used. |

**Analysis Aspect 4: Interpretation of Processed Data** *“The processed data is correctly interpreted so that a completely valid and detailed conclusion to the research question can be deduced.”* ***\_\_\_\_\_\_ / 2 raw 🡪 \_\_\_\_\_ / 6 IB***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **C** | **P** | **N** | *n/a* | *Note: C = Complete, 0.5 pt; P = Partial, 0.25 pt., N = Not at All = 0 pt.* |
|  |  |  |  | The slopes for each of the 3 lines (best-fit, max and min) have been reported with appropriate sig. figs. and units |
|  |  |  |  | The final slope is clearly reported with appropriate uncertainty, sig. figs. and units |
|  |  |  |  | If outliers were present in the data, a statement has been included to outline why they were determined to be an outlier, and what was done with them during processing. |
|  |  |  |  | There is a summary of the lab—an interpretation of the graph to respond to the lab’s purpose and the meaning of the slope. |