**C1151 Beer’s Law Report form**  Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date of Exp. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lab Section \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Data Table: Transfer your notebook data to the tables below*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Solution ID** | **Water**  **mL** | **Stock**  **0.400 M Green** | **Concentration (M)** | **%T** | **Absorbance =-Log (%T/100)** |
| **1. Water Blank** |  |  | 0 M |  |  |
| **2** |  |  |  |  |  |
| **3** |  |  |  |  |  |
| **4** |  |  |  |  |  |
| **5** |  |  |  |  |  |
| **6** |  |  | 0.400 M |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Unknown #** | **Unknown  %T** | **Unknown Absorbance** | **Unknown  Concentration** |
|  |  |  |  |

**Experimental Observation: Determine your unknown’s position within the six standard solutions. Record the identity of the two solutions, based on your eyeball comparisons, on either side of your unknown here:**

**Low Conc. Solution \_\_\_\_\_\_\_\_\_\_ … Unknown… High Conc. Solution \_\_\_\_\_\_\_**

**Data Analysis:**

1. Create an Absorbance (Y) vs. Concentration (X) graph using data from the six standard solutions above.

2. Perform a *linear* trendline analysis of your six data points.   
 Display the equation and R2 value on the graph with a minimum of 8 decimal places.

3. On the same graph, perform a *2nd order* polynomial trendline analysis of your six data points.

Display the equation and R2 value on the graph with a minimum of 8 decimal places.

4. Turn in your graph as the last page of this report.  
  
5. On a separate piece of paper calculate the concentration of the unknown solution using both   
 the linear and 2nd order polynomial trendline equations (Show all work)

6. Choose the best unknown concentration from #4 above and report it with three significant   
 figures in the unknown data table above.

**Questions:**

1. You now know the concentration of your unknown.   
 How would you prepare new standard solutions to improve the accuracy of your unknown’s  
 concentration?

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2. Explain in your own words why we used red light to determine the concentration of a green  
 solution.

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3. Compare your unknown’s concentration with its position within the standard lineup. Does the visual comparison support your experimental concentration determination? Explain.

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4. The following standard solutions were prepared and absorbances measured. Create an absorbance vs. concentration graph and perform 1st and 2nd order trendline analysis of the data. Determine the concentration of an unknown solution with absorbance = 1.055 Include the graph, trendline equations and calculations in your report.

|  |  |
| --- | --- |
| Concentration (M) | Absorbance |
| 0.0450 | 0.0113 |
| 0.0760 | 0.0549 |
| 0.0960 | 0.111 |
| 0.150 | 0.422 |
| 0.250 | 1.953 |