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**POST LAB REPORT QUESTIONS (submit to instructor when mindtap report is due)**

**I. Calculations:** (Show how you calculated the bulleted items; include units and the correct number of significant figures) - Part A: Preparing Kool-Aid solutions

- Mass of mix 1 transferred = Mass of unopened packet 1 – Mass of emptied packet 1x

- Stock solution concentration = x

- First dilution’s concentration =

where

**II. Additional Questions:**

*1. Which wavelength choice among those available with the Vernier colorimeter would be the best choice for a Beer’s Law experiment using strawberry Kool-Aid? Why?*

- The primary objective of Experiment 3 is to determine the concentration of a common food dye, Allura Red, in various red-colored liquid products using Beer’s Law and a technique called spectrophotometry. The color of Allura Red solution is red and has the greatest absorption of light which is 500 nm. Wavelengths of 640-700 nm are not absorbed but transmitted, thus resulting in our perception of a red solution.

- Since there are 4 fixed LED (light emitting diode) sources of the following wavelengths: 430 nm, 470 nm, 565 nm, and 635 nm, the best wavelength of light provided by this colorimeter is 470 nm.

*2. List your data and calculated concentrations for your two unknowns:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Kool-Aid Flavor | Standard curve slope | Y-intercept | Unknown ID | Absorbance | Concentration |
| 1: Grape | 0.000344440  = | -0.0189046  = | Given by instructor | 0.400 | 1216.19  = |
| 2: Black cherry | 0.000835500  = | 0.0185764  = | Given by instructor | 0.500 | 576.210  = 5.76 |

*3. How does the wavelength of maximum absorbance relate to a substance’s color?*

- The maximum absorbance relates to the color because a substance’s color is determined by what wavelengths are being transmitted instead of absorbed; therefore, this affects the color human eyes can see.

*4. Do your stock solutions obey Beer’s Law, given your calibration range equations? Why or why not?*

- We can see that they do obey Beer’s Law by taking a look at our graphs and seeing that the concentration is proportional to the absorbance. As one grows, so does the other and vice versa.

*5. How did your transferred mix mass compare to the amount listed on the package label?*

- The transferred mix mass is compared to be similarly close to the amount listed on the package label. We see that the emptied packet weights about 1 gram, so the mix mass is a little less because the packet has the total weight.

6. A lab pair’s Beer’s Law calibration graph 0.08 < A < 0.79 had a best-fit line of A = 0.013C − 0.023. Data was: off-scale for both the stock solution and solution #1 (10.00 mL stock diluted to 25.00 mL); solution #2 (1.00 mL stock diluted to 25.00 mL) had A = 0.85, and solution #3 (1.00 mL of solution #1 diluted to 25.00 mL) had A=0.73. What are the concentrations of solution #3 and the stock solution?

0.73 = 0.013C – 0.023

Solution #3: C = 57.92 mg/L

1L = 1000 mL 25mL = 0.025 L

Mass solution #1 =

Solution #1: C =

Dilution =

Stock solution concentration is 3620 mg/L

**GRAPH BELOW OF BOTH SOLUTIONS**

|  |  |
| --- | --- |
| Concentration | Absorbance |
| 0 | 0 |
| 239.315 | 0.051 |
| 478.630 | 0.120 |
| 717.945 | 0.244 |
| 957.260 | 0.313 |
| 1196.575 | 0.395 |

Chart, scatter chart

Description automatically generated

|  |  |
| --- | --- |
| Concentration | Absorbance |
| 0 | 0 |
| 197.110 | 0.204 |
| 315.376 | 0.280 |
| 433.642 | 0.386 |
| 551.908 | 0.498 |
| 670.174 | 0.555 |

Chart, scatter chart

Description automatically generated