Lab 11: Alcohol Determination Lab

Report:
A middle school principal suspects some of the students are bringing flavored water drinks to school that are “spiked” with alcohol and drinking them in-between classes. A surprise locker search was conducted and the principal confiscates several of the drinks and brings them to you to be tested.

You are to turn in a report stating which (if any) of the water samples provided has been “spiked” with alcohol. You need to also determine the percent of alcohol in any of the “spiked” samples. To do this, you will need to make a working curve of absorbance vs. percent concentration of alcohol for known samples. Make sure your report includes:

1. The working graph (from #8 in Part One).
2. Identify the “spiked” sample(s) along with the percent of alcohol of each for four different samples. Show all data including the numbers of your unknown samples.
3. What instrument you used to determine whether or not the samples were “spiked”. Include an explanation of what exactly this instrument measures.
4. A description of the three main components that determine how the absorbance of light is measured for a solution.

Procedure:
Part One: Making the Working Curve
1. Make a blank by adding 2 drops of chromic acid to 4.00 mL of water in a small graduated cylinder. Pour this blank solution into a cuvette.
2. Place 1.00 mL of each known sample (5%, 10%, 15%, 20%, 25%) in separate large test tubes and add 4 drops of chromic acid to each sample. Wait thirty minutes.
3. Add 7.00 mL of water to each sample. Cover with Parafilm and mix thoroughly.
4. Make sure the spectrophotometer is set at 580 nm.
5. Set the 0% knob with no sample in the chamber.
6. Set the 100% transmittance with the chromic acid blank (from #1).
7. Switch the mode over to absorbance.
8. Read and record the absorbance of each known sample. Check the 0% and 100% transmittance settings periodically.
9. Make a graph of absorbance (y-axis) versus percent concentration of alcohol (x-axis). Use graph paper, a pencil, and a ruler to make your graph as accurate as possible. Draw a “best fit” line through your data points.

Part Two: Testing the Unknown Samples
1. Place 1.00 mL of the potentially “spiked” sample in a separate large test tube and add 4 drops of chromic acid to the sample. Wait thirty minutes.
2. Add 7.00 mL of water to this sample. Cover with Parafilm and mix thoroughly.
3. Make sure the spectrophotometer is set at 580 nm.
4. Set the 0% knob with no sample in the chamber.
5. Set the 100% transmittance with the chromic acid blank.
6. Switch the mode over to absorbance.
7. Read and record the absorbance of the unknown sample.
8. Repeat steps #1-6 for three other unknown samples. Check the 0% and 100% transmittance settings periodically.
9. Using your graph from Part One and your measured absorbances, determine the percent concentration of alcohol (if there is any) for each of your unknown water samples.

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Paper Idea III:
Write a paper on alcoholism. What is it? What are the physical effects of alcohol abuse, both in the short-term and long-term? What are the emotional effects of alcohol abuse? What are some ways to treat and overcome alcoholism? Include a discussion of drug treatments used to overcome alcoholism along with how these drugs work.

Note: Do not merely answer these questions in order, but write a coherent paper that addresses the above issues. The paper must be typed, should not be longer than 5 pages (double spaced, reasonable margins), and must include at least 2 references (web references are fine). The work must be your own.