Virtual Lab Experiment for
Alcohol Density Problem:
Determining the % Alcohol in Beverages

Objective

To classify the alcohol in **Alcoholic Beverage A** and **Alcoholic Beverage B** in one of these four categories:

1. less than 2.3%
2. between 2.3% - 7%
3. between 7% - 20%
4. greater than 20%

Procedure

1. Determine the density of the 2.3% alcohol solution.

    a. Obtain the following chemicals and equipment:
        - 1M Alcohol (4.6 % alcohol solution)
        - $H_2 0$
        - One 100 mL Volumetric Flask
        - Scale

    b. Place the empty 100 mL volumetric flask on the scale and press TARE.
    c. Pour 50 mL of 1 M alcohol into the volumetric flask.
    d. Pour 50 mL of water into the same volumetric flask.
    e. Record the mass.
    f. Calculate the density of 2.3% alcohol solution by dividing the mass over the volume.

2. Determine the density of the 7% alcohol solution.

    a. Obtain the following chemicals and equipment:
        - 70% Alcohol
        - $H_2 0$
        - One 100 mL Volumetric Flask
        - Scale

    b. Place the empty 100 mL volumetric flask on the scale and press TARE
    c. Pour 10 mL of the 70% alcohol solution into a 100 mL volumetric flask.
    d. Pour 90 mL of water into the same volumetric flask.
    e. Record the mass
    f. Calculate the density of the 7% alcohol solution.

3. Determine the density of the 20% alcohol solution.

a. Obtain the following chemicals and equipment:
- Alcohol 70%
- $H_2 0$
- One 100 mL Volumetric Flask
- Scale

b. Place the empty 100 mL volumetric flask on the scale and press TARE.
c. Pour 28.6 mL of the 70% alcohol solution into the volumetric flask.
d. Pour 71.4 mL of water into the same volumetric flask.
e. Record the mass
f. Calculate the density of the 20% alcohol solution.

4. Determine the density of Alcoholic Beverage A.

a. Obtain Alcoholic Beverage A and a new 250 mL beaker.
b. Place the empty 250 mL beaker on the scale and press TARE.
c. Pour 50 mL of the alcohol into the beaker.
d. Record the mass.
e. Calculate the density.

5. Determine the density of Alcoholic Beverage B.

a. Obtain Alcoholic Beverage B and a new 250 mL beaker.
b. Place the empty 250 mL beaker on the scale and press TARE.
c. Pour 50 mL of the alcohol into the beaker.
d. Record the mass.
e. Calculate the density.

6. Compare the density of Alcoholic Beverage A and Alcoholic Beverage B with the densities of 2.3% alcohol solution, 7% alcohol solution and 20% alcohol solution. Categorize the Alcoholic Beverage A and Alcoholic Beverage B in one of these four categories:

1. less than 2.3%
2. between 2.3% - 7%
3. between 7% - 20%
4. greater than 20%

Data

2.3% Alcohol solution: Mass _____ Volume _____ Density _____

7% Alcohol solution: Mass _____ Volume _____ Density _____

20% alcohol solution: Mass _____ Volume _____ Density _____

Beverage A: Mass _____ Volume _____ Density _____ Category _____

Beverage B: Mass _____ Volume _____ Density _____ Category _____

Assessment

Questions	Strongly agree	Agree	Disagree	Strongly disagree
The directions were clear and easy to follow.				
It helped me to become more proficient in density calculations.				
It helped me to better understand the concentration units and dilutions.				
I have enjoyed doing this exercise.				

In my opinion,

strengths of this exercise is:

weaknesses of this exercise is:

I would like to make the following suggestions: