**Measurements I:
Density of a
Liquid**

Prelab 1

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Name

01/13/21
Time

M T W R F

A student obtained a clean flask. She weighed the flask and stopper on an analytical balance and found the total mass to be 32.834 g. She then filled the flask with water and found the new mass to be 69.478 g. The temperature of the water was measured to be 24°C. Use this data to find the internal volume of the stoppered flask. The density of water at various temperatures is given in Appendix H. Show all calculations necessary to answer the following questions.

First calculate the mass of the water in the flask:

Mass of water = mass of filled flask − mass of empty flask   water in flask

1. Mass of water = ___69.478___ g − ___32.834___ g

    ↳ 36.644

Mass of water: 36.644

[handwritten notes:]
Total mass: 32.834g
→ New mass: 69.478 g
Temp of water: 24°C
Internal volume of the
stopped flask?

density: 1.0037 ↳ *at 24°C*   *mass of water: 36.644* *volume:*

■ **Measurements I: Density of a Liquid**

Use the density to determine the volume of water. Density = mass/volume, or

$$\text{Volume = mass/density} \longrightarrow$$

2. Volume water = volume of flask = *36.5089* cm³

$$\frac{36.644}{1.0037} = 36.5089$$

Next, the student emptied the flask and dried it. She then filled it with a liquid whose density she did not know. The mass of the stoppered flask (when completely full) was determined to be 56.852 g. The temperature of the liquid was 24°C. Find the density of the liquid.

First, find the mass of liquid (as in 1 above):

full flask: 56.852g *temp: 24°C*

3. Mass of liquid = *56.852* g – *32.834* g

↳ *mass of liquid: 24.018*

Next, use the volume of the flask (from 2) to calculate the density of the liquid according to Density = mass / volume

4. Density of liquid = $\underline{0.6578}$ g/cm³

$$\frac{24.018}{36.5089} = 0.65786698..$$

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