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Group No.: 04

Date of Exp.: 2022/10/14

**Exp. 1 Basic Laboratory Operations**

**Purpose:**

* To light and properly adjust the flame of a Bunsen burner
* To develop the technique of using a pipet and the skill for properly operating a balance
* To determine the density of an unknown substance

**Materials and Reactions (if any):**

* Bunsen Burner: Bunsen burner, wire gauze
* Laboratory Balance: balances, 10ml cylinder, water
* Density: balances, unknown water-insoluble solid, liquid unknown, liquid water, cylinder

**Procedure:**

* Bunsen Burner

1. Lighting the burner.
2. Attach the tubing from the burner to the gas outlet on the lab bench. Close the gas-control valve on the burner and fully open the gas valve at the outlet.
3. Close the air-control holes at the base of the burner and slightly open the gas- control valve.
4. Bring a lighted match or striker up the outside of the burner barrel until the escaping gas at the top ignites.
5. After the gas ignites, adjust the air-control valve until the flame is pale blue and has two or more distinct cones.
6. Slowly further open the gas-control valve of the burner until you hear a slight buzzing.
7. If the flame goes out, immediately close the gas valve at the outlet and repeat the procedure for lighting the burner.
8. Observing flame temperatures using a wire gauze.
9. Using crucible tongs (or forceps), hold a wire gauze parallel to the burner barrel just above the burner top. Observe the relative heat zones of the flame. Sketch a diagram of your observations on the Report Sheet.

* b. Close (or nearly close) the air-control valve and repeat the observation with a luminous flame.
* **Precision of a measurement**
  + Obtain a 10mL graduated cylinder and measure and tare its mass (0.001g) on your assigned balance. Add 7mL (0.1mL) of water and measure the combined mass. Calculate the mass of 7mL of water. Refer to Technique 16A for reading and recording a volume.
  + Discard the water and again fill the graduated cylinder to the 7mL mark. Record the mass measurement on the Report Sheet. Repeat this procedure at least five times. Calculate the average mass of 7mL of water.

1. Water-insoluble solid
   1. Obtain an unknow solid and record its number. Using the assigned balance tare the mass of a piece of weighing paper, place the solid on the weighing paper and measure its mass. Record the mass according to the sensitivity of the balance.
   2. Half-fill a 10mL (or larger) graduated cylinder with water and record its volume.
   3. Slide the known mass of solid into the graduated cylinder held at angle. Roll the solid around in the cylinder, removing any air bubbles that are trapped or that adhere to the solid. Record the new water level. The volume of the solid is the difference between the two water levels.
   4. Remove the solid, dry it, and measure its volume a second time.
2. Liquid, water
   1. Clean your smallest laboratory beaker. Using your assigned balance, measure and record its mass. Pipet 5mL of water into the beaker.
   2. Measure and record the mass of the beaker and water. Calculate the density of water from the available data. Repeat the density determination for Trial2.
   3. Collect and record the density value of water at room temperature from five additional laboratory measurements from classmates. Calculate the average density of water at room temperature.
3. Liquid, unknown
   1. Dry the beaker and pipet.
   2. Rinse the pipet with two 1mL quantities of the unknown liquid and discard.

**Calculations:**

D(density)=M(mass)/V(volume)

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**Exp. 2 Identification of a Compound: Chemical Properties**

**Purpose:**

* To identify a compound on the basis of its chemical properties OBJECTIVES.
* To design a systematic procedure for determining the presence of a particular compound in aqueous solution.

**Materials and Reactions (if any):**

Sodium chloride:

Sodium carbonate:

Magnesium sulfate:

Ammonium chloride:

Water:

**Reagent:**

Silver nitrate:

Sodium hydroxide:

Hydrochloric acid:

**Procedure:**

* **Summarize** the procedure to be followed in **bullet-points**. It must include enough information that you could repeat the exp without reading the textbook.

1. **Chemical Properties of Known Compounds**
2. **Observations with silver nitrate test reagent:**
3. Use a permanent marker to label five small, clean test tubes or set up a clean 24-well plate. Place ~1ml of each of the five known solutions into the labeled test tubes.
4. Use a dropper pipet to deliver the silver nitrate solution to each of the known solutions. After adding several drops you observe a chemical changes. Record your observations on the report sheet.
5. **Observations with sodium hydroxide test reagent:**
6. Place 1ml of each of the five “known” solutions into this second set of labeled test tubes.
7. To each solution, add 5 to 10 drops of the sodium hydroxide into each solution. Check for whether gas evolves, the odor changes or any precipitate appears.
8. **Observations with hydrochloric acid test reagent:**
9. Place 1ml of each of the “known” solutions into this third set of labeled test tubes.
10. Add 5-10 drops of the hydrochloric test reagent into the solutions. And check whether the gas evolves and the odor.
11. Repeat the three tests in A.1,2,3. And identify the unknown solutions.
12. **Chemical Properties of Unknown Compounds:**

Preparation of solutions: About 1 ml of each test solution.

Preparation of reagents: three reagents labeled.

Testing the solutions: Test each five solutions of reagents A. After adding several drops, add 5-10 drops more to see there are additional changes.

identification of unknown: An unknown solution will be issued and identify your unknown.

Safety precaution:

1. Approved safety goggles or eye shields.

2. Clothing should be only non-synthetic (cotton).

3. Gloves are to be worn to protect the hands.

4. Secure long hair (tide it on).

5. Jewelry should be removed.