**CHEMISTRY 2022-23 January 6, 2023**

**Today’s Agenda (Day 82)**

1. HOUSEKEEPING ITEMS

**🡪**  BRING:

1. Homework Check:

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1. Class Activity:

🡪**In-Class Practice: Extra Stoichiometry Problems**

🡪DAY 2: Chapter 11 PPT Review

1. ~~Section 11.1 – Defining Stoichiometry~~
2. **Section 11.2 – Stoichiometric Calculations**
3. Section 11.3 – Limiting Reactants
4. Section 11.4 – Percent Yield

HOMEWORK:

* READ: Chapter 11 – Stoichiometry
* COMPLETE: Practice: Balancing Equations, Naming Compounds and Writing Formulas – p. 2 of doc
* STUDY: Chapter 11 Test

REMINDERS:

* Practice: Balancing Equations, Naming Compounds and Writing Formulas – Jan. 6
* QUIZ:Balancing Equations & Naming Compounds – Jan. 10
* TEST: **Ch 11 🡪 Jan. 12**

**CHEMISTRY 2022-23 PRACTICE**

**Chemistry 12**

**Extra Stoichiometry Problems**

1. Silver nitrate reacts with barium chloride to form silver chloride and barium nitrate.

a. Write and balance the chemical equation.

b. If 39.02 grams of barium chloride are reacted in an excess of silver nitrate, how many representative particles (and what type) of silver chloride are produced?

c. If 410.8 grams of barium nitrate are produced how many grams of silver nitrate were reacted?

1. Nitrogen gas is reacted with hydrogen gas to form nitrogen trihydride.
	1. Write and balance the chemical equation.
	2. How many liters of nitrogen trihydride are produced at STP if 80.28 grams of hydrogen gas are reacted in an excess of nitrogen?

c. How many grams of hydrogen are needed to fully react 621.9 grams of nitrogen gas?

d. How many liters of nitrogen gas are needed to completely react 90.38 L of hydrogen gas at STP?

1. For the following problem, use the following chemical equation:

C8H18(l) + O2(g) ! CO2(g) + H2O(g)

a. Balance the chemical equation.

b. How many moles of oxygen are needed to fully react 837.4 grams of C8H18?

c. How many liters of carbon dioxide gas are formed at STP when 3.829 x 1025 representative particles of C8H18 are reacted in an excess of oxygen gas?

d. How many grams of water are produced when 382.9 liters of oxygen gas at STP are fully reacted?

**CHEMISTRY 2022-23 PRACTICE**

**CHEMISTRY 12**

Balancing Equations, Naming Compounds and Writing Formulas

PART I. Name the compounds below. Includes molecular and ionic compounds, polyatomic ions, acids, and transition metals.



PART II. Write formulas for the compounds below. Includes molecular and ionic compounds, polyatomic ions, acids, and transition metals.



PART III. **Balance** each of the chemical equations shown below. **Classify** each reaction as being one of the following: decomposition, synthesis, single-replacement, double-replacement, or combustion.



**CHEMISTRY 2022-23 LAUNCH LAB**

**CHAPTER 11 LAUNCH LAB – What Evidence Can You Observe That a Reaction is Taking Place?**

During a chemical reaction, reactants are consumed as new products are formed. Often, there are several telltale signs that a chemical reaction is taking place.

**Procedure **

1. Read and complete the lab safety form.

2. Use a **10-mL graduated cylinder** to measure out 5.0 mL **0.01M potassium permanganate** (KMnO4). Add the solution to a **100-mL beaker**.

3. Clean and dry the graduated cylinder, and then use it to measure 5.0 mL **0.01M sodium hydrogen sulfite** solution (NaHSO3). Slowly add this solution to the beaker while stirring with a stirring rod. Record your observations.

4. Repeat Step 3 until the (KMnO4) solution in the beaker turns colorless. Stop adding the NaHSO3 solution as soon as you obtain a colorless solution. Record your observations.

**Analysis**

1. Identify the evidence you observed that a chemical reaction was occurring.

2. Explain why slowly adding the NaHSO3 solution while stirring is a better experimental technique than adding 5.0 mL of the solution all at once.

**Inquiry**

Would anything more have happened if you continued to add NaHSO3 solution to the beaker? Explain.

**CHEMISTRY 2022-23 PRACTICE PROBLEM**

**CHAPTER 11 – Stoichiometry**

**Practice Problems 11.1 –** Interpreting Chemical Equations



**Practice Problems 11.1 –** Mole Ratios



**Practice Problems 11.2 –** Mole-to-Mole Stoichiometry



**Practice Problems 11.3 –** Mole-to-Mass Stoichiometry



**Practice Problems 11.4 –** Mass-to-Mass Stoichiometry



**Practice Problems 11.5 –** Determining the Limiting Reactant



**Practice Problems 11.6 –** Percent Yield



**CHEMISTRY 2022-23 MINI LAB**

**CHAPTER 11 MINI LAB – Apply Stoichiometry**

**How much sodium carbonate (Na2CO3) is produced when baking soda decomposes?**

Baking soda is used in many baking recipes because it makes batter rise, which results in a light and fluffy texture. This occurs because baking soda, sodium hydrogen carbonate (Na2CO3), decomposes upon heating to form carbon dioxide gas according to the following equation.

2 Na2CO3 → Na2CO3 + CO2 + H2O

**Procedure **

1. Read and complete the lab safety form.

2. Create a data table to record your experimental data and observation.

3. Use a **balance** to measure the mass of a clean, dry **crucible**. Add about 3.0 g of **sodium hydrogen carbonate** (Na2CO3) and measure the combined mass of the crucible and Na2CO3. Record both masses in your data table and calculate the mass of the Na2CO3.

4. Use this starting mass of Na2CO3 and the balanced chemical equation to calculate the mass of Na2CO3 that will be produced.

5. Set up a **ring stand** with a **ring** and **clay triangle** for heating the crucible.

6. Heat the crucible with a **Bunsen burner**, slowly at first and then with a stronger flame, for 7–8 min. Record your observations during the heating.

7. Turn off the burner and use **crucible tongs** to remove the hot crucible.

**WARNING: Do not touch the hot crucible with your hands.**

8. Allow the crucible to cool, and then measure the mass of the crucible and Na2CO3.

**Analysis**

1. Describe what you observed during the heating of the baking soda.

2. Compare your calculated mass of Na2CO3 with the actual mass you obtained from the experiment.

3. Calculate Assume that the mass of Na2CO3 that you calculated in Step 4 is the accepted value for the mass of product that will form. Calculate the error and percent error associated with the experimentally measured mass.

4. Identify sources of error in the procedure that led to errors calculated in Question 3.