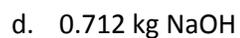
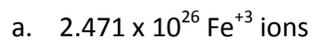


Stoichiometry Review

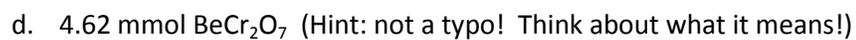
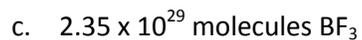
Review

1. What is the mole?
2. What conversion factor should be used to convert from moles to mass and vice versa?
3. Explain how to calculate the molar mass of a compound.
4. What is Avogadro's number? When do you use it?
5. Calculate the molar mass of the following compounds:
 - a. AgNO_2
 - b. $\text{Cu}_2\text{C}_4\text{H}_4\text{O}_6$
 - c. $\text{CuSO}_4 \cdot 7\text{H}_2\text{O}$
 - d. copper (II) hydroxide
 - e. aluminum sulfate
 - f. magnesium chromate

6. Convert the following units to moles:



7. Convert the following units to grams:



Stoichiometry

8. What is stoichiometry? How is it used?

9. What is a mole ratio?

10. Why is a balanced equation needed in solving stoichiometric calculations?

11. Why must moles, not mass, be used as the basis of stoichiometric calculations?

12. Summarize the steps for solving all stoichiometric problems.

13. Complete the following table for any missing information

	ammonium nitrate	→	dinitrogen oxide	+	water
Equation:		→		+	
Mass (g):		→		+	
Moles:		→		+	6.33 mol

14. How many moles of each product are formed from 2.25 mol NH_4NO_3 from the reaction below:



a. N_2O

b. H_2O

15. Magnesium burns in oxygen to produce magnesium oxide. How many moles of oxygen are needed to burn 0.52 mol of magnesium?

16. One common chlorofluorocarbon is CFC-12 or Freon-12, which has the formula CCl_2F_2 . It can be prepared from the reaction between hydrogen fluoride gas and carbon tetrachloride. The remaining product is hydrochloric acid (HCl).

- a. Write and balance the chemical equation.

- b. Calculate the mass of CCl_4 needed to react completely with 50.0 g HF.

- c. Calculate the mass of CCl_2F_2 produced when 50.0 g HF reacts completely.

17. In the “gummy bear” reaction from class, the first reaction was a decomposition of potassium chlorate. When heated, potassium chlorate produces oxygen gas and potassium chloride.

- a. Write and balance the chemical equation.

- b. How many grams of oxygen will be produced from 55.4 g of potassium chlorate?

- c. How many grams of potassium chloride will be produced from 55.4 g of potassium chlorate?

Percent Yield

18. How is percent yield calculated?
19. What is the difference between the theoretical and actual yields of a reaction?
20. What are possible reasons why the experimental (or actual) yield is less than the theoretical yield?
21. What are the possible reasons why the percent yield is greater than 100%?
22. Determine the percent yield for the reaction of Rb and O_2 if the theoretical yield is 52.1 g Rb_2O but only 39.7 g are produced.

Limiting Reagent

23. What is the limiting reactant of a chemical reaction? Why is it important to know when conducting a reaction?

24. Ammonia gas, NH_3 , produced as a by-product in an industrial reaction is reacted with sulfuric acid, H_2SO_4 , in order that the gas does not escape into the atmosphere. The product, ammonium sulfate, can be used as a fertilizer. Assume that 100.0 kg of NH_3 is reacting with 100.0 kg of sulfuric acid.

- a. Write and balance the chemical equation.
- b. What is the limiting reactant?
- c. What is the mass of ammonium sulfate produced?
- d. What is the mass of excess reactant remaining?
- e. Assuming that 98.32 kg of H_2SO_4 is produced, what is the percent composition?

25. Assume that you have 1.39 mol of H_2 and 3.44 mol of N_2 . How many grams of ammonia, NH_3 , can you make, and how many grams of which reactant will be left over?

26. In the following reaction, sodium metal reacts with excess oxygen to produce sodium oxide. What is the limiting reactant? Explain.



27. In the lab you combine iron and sulfur to produce iron (III) sulfide. You obtain the following laboratory data. Use this information to answer the questions.

Mass of weighing vial	2.006 g	Mass of weighing vial	2.015 g
Mass of vial + Fe	5.634 g	Mass of vial + S	5.906 g
Mass of Fe	_____	Mass of S	_____
Mass of crucible	35.67 g		
Mass of crucible + Fe₂S₃	41.71 g		
Mass of Fe₂S₃	_____		

- Write and balance the chemical equation.
- Complete the data table above with the missing information.
- What is the limiting reactant?
- What is the theoretical mass of Fe₂S₃ produced?
- What is the percent yield based on your data?
- Give reasons why the mass of the reactants contain more significant figures than the mass of the product Fe₂S₃.