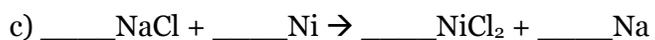
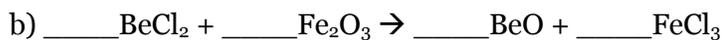
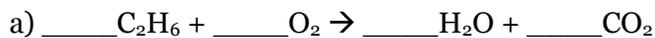




d) An ion of Sulfur-32

### Stoichiometry

3. Balance the following equations:



4. Write the following equations:

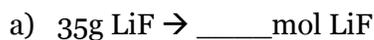
a) The combustion of butane ( $\text{C}_4\text{H}_{10}$ )

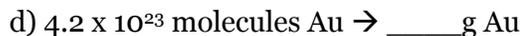
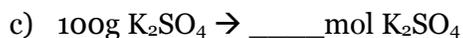
b) Hydrochloric acid and calcium react in a single replacement reaction

c) Sodium hydroxide and phosphoric acid react in a double replacement reaction

d) The decomposition of hydrobromic acid

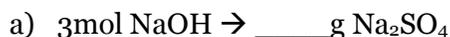
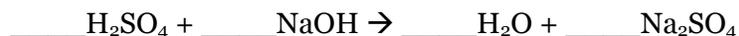
5. Covert the following:



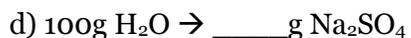
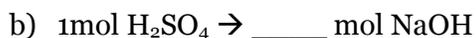


6. Balance the following equation and use it to solve the following questions.

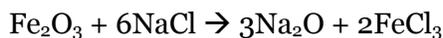
7.



b) How many grams of water would be produced if 60g of NaOH was placed in a solution with an excess amount of sulfuric acid?



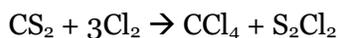
8. Use your knowledge of limiting and excess reagents to solve the following problems. (Use the balanced equation below to help you)



a) The reaction above occurs with 250g of both iron(III) oxide and sodium chloride. Determine the amount of iron(III) chloride that will be produced at the end of the reaction.

b) What is the amount of excess reagent that is left over after the reaction has been completed?

9. Use your knowledge of percent yields to complete the following questions.



a) Determine the theoretical yield of carbon tetrachloride if 125g of  $\text{CS}_2$  was placed in excess chlorine gas.

b) Determine the percent yield from part a if only 25g of  $\text{CCl}_4$  was able to be recovered.

10. Use your knowledge of percent composition and molecular formulas to answer the following questions.

a) Determine the empirical formula for a molecule that is 27.3% carbon and 72.7% oxygen.

b) If the molecule from part a had a molar mass of 88g/mol, what would its molecular formula be?

### Gas Laws

11. Using your knowledge of the ideal and combined gas laws, answer the following.

a) Determine the number of moles of  $\text{O}_2$  in a 2L container when it is at 25°C and 1.27atm.

b) There is an isochoric container that is holding 2L of hydrogen gas at STP. If the container is then heated up to 100°C, what would the pressure in the container change to?

**Part 2)** The following questions are from past AP exams and deal with the subject matter you have just been reviewing. Use the skills and knowledge you have to complete them. (Don't let the wording throw you off; focus on what information you are being given)

1. The table below contains information about three different types of copper ore that are found when mining.

Ore #	Empirical Formula	Percent by Mass of Copper	Percent by Mass of Sulfur	Percent by Mass of Iron
1	Cu <sub>2</sub> S	?	?	0
2	?	34.6	34.9	30.5
3	?	55.6	28.1	16.3

- a) What is the percent by weight of copper in Cu<sub>2</sub>S (Ore #1)?
- b) What is the empirical formula for Ore #2?
- c) If a sample of Ore #3 contains 11g of iron, how many grams of sulfur does it contain?
- d) Copper can be extracted from the copper(I) sulfide through the following reaction:  
$$3\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 3\text{SO}_2 + 6\text{Cu}$$

If 3.84g of O<sub>2</sub> are consumed in the process, how many grams of Cu are produced?

2. A gaseous hydrocarbon sample is completely combusted producing 1.8L of carbon dioxide at STP and 2.16g of water.
  - a) What is the empirical formula for this hydrocarbon?
  - b) What is the mass of the hydrocarbon that was consumed?
  - c) The hydrocarbon was originally in a closed 1L container at a pressure of 1atm and a temperature of 32°C. What is the molecular formula of the hydrocarbon?
  - d) Write the balanced equation for the combustion of this hydrocarbon.