

# AP Chemistry Summer Homework

*Join the AP Chemistry Google Classroom NOW!!! code: zx995si*

Welcome to AP Chemistry - one of the most challenging courses you will take in high school! To ensure that you come fully prepared and ready for the rigor of AP Chem you will need to complete the following summer assignment. Getting familiar with the AP Chemistry textbook and style of questioning is going to be a key to your success. This assignment is meant to be a little review as well as some new material. Completion of the work in this packet will be your first set of homework grades for the course. In addition - - - you will be formally assessed on this information the first week of school. (The first week of school this year is only two days, that means a TEST on the second day of school!!)

**Online Resources:** Bozeman Science and Tyler DeWitt videos (on YouTube) are very helpful for concepts you may not understand or need a quick refresher. The Bozeman videos closely follow the textbook so they will be a very good resource for you. The Tyler DeWitt videos cover basic chemistry skills and concepts and he explains things in a very understandable manner with good visuals (and lots of hand waving).

## **Summer Support:**

AP Chemistry Boot Camp August 27-29th, 8:00 am - 12:00 pm. Room 142 DHS.

→ AP Chem Boot Camp is NOT a place “to get your summer homework done.” Boot Camp is a resource for students who have completed their summer homework packets and STILL have some, very specific, questions. Message me through Google Classroom to let me know if you are coming to Boot Camp at LEAST one week prior to Boot Camp!

## **Materials Needed:**

- 3-ring binder with PLENTY of quality loose-leaf paper
- Dividers for notebook (this is optional if you like dividers, get some!)
- Calculator
- Lots of pencils for notes and practice problems
- Ballpoint pens (for labs)
- Laboratory Notebook (will be supplied by the school for you)

## **Structure of Homework:**

- A. Concepts to take notes on (*do this on loose-leaf for your binder, develop a good note-taking and organization system*)
- B. Things to memorize (*make flashcards!*)
- C. Practice problems (*complete in this packet*)

**\*\*If you cannot locate something in your textbook, use online resources!**

# Chapter 1: Chemical Foundations

**1.1 Chemistry: An Overview** – Read this short section as an introduction.

## **1.2 The Scientific Method**

A. Take notes:

- Quantitative and qualitative observations/data (examples are helpful)
- Theory/model, natural law, compare and contrast these two

B. Memorize/Flashcards - n/a

C. Practice Problems - n/a

## **1.3 Units of Measurement**

A. Take notes:

- 2 required parts of a measurement
- SI System - history, what is it
- Fundamental SI Units (leave out luminous intensity)
- Define volume, mass, and weight

B. Memorize/Flashcards - Table 1.2 -- Prefix, symbol, meaning, exponential notation of those in BLUE

C. Practice Problems

1. Mary's height is measured and recorded at 1.65. What is wrong with this measurement? Is it a quantitative or qualitative observation?

2. If you traveled to the moon...of volume, mass, and weight - which of these values would change? Which wouldn't? Explain.

### **1.4 Uncertainty in Measurement:**

A. Take notes:

- Define: accuracy, precision, random error, systematic error (use examples and/or diagrams to help your understanding)

B. Memorize/Flashcards - n/a

C. Practice Problems

3. A student performed an analysis of a sample of limestone for its calcium content and got the following results: Trial 1: 14.92% Ca; Trial 2: 14.91% Ca; Trial 3: 14.88% Ca; Trial 4: 14.91% Ca. The actual amount of calcium in the sample is 15.70%.

a. Find the average experimental value and the range of values.

Average \_\_\_\_\_ Range \_\_\_\_\_

b. Would you say this data is accurate? Precise? Explain.

c. What type of error seems to have occurred? Explain how you know.

### **1.5 Significant Figures and Calculations:**

A. Take notes:

- Rules for counting sig figs (shorten these up!)
- Rules for sig figs in mathematical operations
- Rules for rounding

B. Memorize/Flashcards - n/a

C. Practice Problems

4. Indicate the number of sig figs in each of the following:

a. A mile is about 5300 ft. \_\_\_\_\_ b. 463.8052 \_\_\_\_\_

c. A liter is equivalent to 1.059 qt. \_\_\_\_\_ d. 0.003840 \_\_\_\_\_

e. 17.00 \_\_\_\_\_ f.  $4.0050 \times 10^6$  \_\_\_\_\_

5. Perform the following mathematical operations and express each result to the correct number of sig figs:

a.  $52.331 + 26.01 + 0.9981 =$  \_\_\_\_\_

b.  $7.25 - 6.8350 =$  \_\_\_\_\_

c.  $(6.404)(2.91) =$  \_\_\_\_\_

d.  $(6.6262)(2.998)/2.54 =$  \_\_\_\_\_

e.  $(6.02 \times 10^{23})(24.3)/184.5 =$  \_\_\_\_\_

**1.6 Learning to Solve Problems Systematically** – Read this short section.

**1.7 Dimensional Analysis:**

A. Take notes:

- Study examples 1.5-1.10. Put examples in notes as needed

B. Memorize/Flashcards - n/a

C. Practice Problems (**use Table 1.4 on pg. 18 for English-Metric equivalents**)

6. The circumference of the earth is 25,000 miles at the equator. What is the circumference in kilometers?

7. The typical speed limit on the Interstate system is 70 miles per hour. A. Convert this to kilometers per hour. B. Convert it to meters per second.

8. Congratulations! You and your spouse are the proud parents of a new baby, born while you are vacationing in Spain, a country that uses the metric system. The nurse has informed you that the baby weighs 3.91 kg and is 51.4 cm long. Convert your baby's weight to pounds AND her length to inches.

## **1.8 Temperature**

A. Take notes:

- 3 temperature scales – uses of each, boiling point of water, freezing point of water on each scale (Figure 1.9 would be a helpful diagram to put in your notes)
- Formulas for converting between temperature scales

B. Memorize/Flashcards – How to convert between Celsius and Kelvin

C. Practice Problems

9. Convert to Kelvin:            a.  $39.2^{\circ}\text{C}$  \_\_\_\_\_    b.  $-25^{\circ}\text{C}$  \_\_\_\_\_

10. Convert to Celsius:  
a.  $-459^{\circ}\text{F}$  \_\_\_\_\_    b.  $68^{\circ}\text{F}$  \_\_\_\_\_

11. Convert to Fahrenheit:  
a.  $801^{\circ}\text{C}$  \_\_\_\_\_    b.  $100^{\circ}\text{C}$  \_\_\_\_\_

## **1.9 Density**

A. Take notes:

- Definition of density, formula to calculate density, units of density, uses of density

B. Memorize/Flashcards - n/a

C. Practice Problems

12. A rectangular block has dimensions 2.9 cm x 3.5 cm x 10.0 cm. The mass of the block is 615.0 grams. What is the density of the block?

13. A material will float on the surface of a liquid if the material has a density less than that of the liquid. Given that the density of water is approximately 1.0 g/mL, will a block of material having a volume of  $125\text{ cm}^3$  and having a mass of 1.5 pounds sink or float when placed in the water?

14. Diamonds are measured in carats; 1 carat = 0.200g. The density of diamond is  $3.51 \text{ g/cm}^3$ . What is the volume of a 5.0 carat diamond?

### **1.10 Classification of Matter**

A. Take notes:

- 3 states of matter – shape, volume – definite or indefinite
- Make a flowchart to define, give examples, and organize: matter, mixture, homogeneous mixture, heterogeneous mixture, solution, pure substance, element, compound
- Physical change – define, give examples
- Ways to separate mixtures
- Chemical change – define, give examples

B. Memorize/Flashcards - n/a

C. Practice Problems

15. Classify as a mixture or a pure substance:

- a. water \_\_\_\_\_
- b. blood \_\_\_\_\_
- c. uranium \_\_\_\_\_
- d. brass \_\_\_\_\_
- e. iron \_\_\_\_\_

f. Of the pure substances, which are elements? \_\_\_\_\_

e. What would be an easy way to decide if something is an element?

16. Suppose a teaspoon of magnesium filings and a teaspoon of powdered sulfur are placed together in a beaker. Would this be considered a mixture or a pure substance?

Now suppose the beaker is heated so they react with each other forming magnesium sulfide. Would this be considered a mixture or a pure substance?

17. During a very cold winter, the temperature may remain below freezing for extended periods. However, fallen snow can still disappear, even though it is too cold to melt. This is possible because a solid can vaporize directly, without passing through the liquid state. Is this process (called sublimation) a physical or a chemical change?

18. Which of the following describes a chemical property?

- a. The density of iron is  $7.87 \text{ g/cm}^3$
- b. A platinum wire glows red when heated.
- c. An iron bar rusts.
- d. Aluminum is a silver-colored, non-magnetic metal

Chapter 1 Challenge problems: Solve #110, 111, 115, 116, 118 on Loose-Leaf and attach your work to the packet.

Chapter 1 AP Multiple Choice Review: #1-10 Record answers below:

- |    |     |
|----|-----|
| 1. | 6.  |
| 2. | 7.  |
| 3. | 8.  |
| 4. | 9.  |
| 5. | 10. |

# Chapter 2: Atoms, Molecules, & Ions

## 2.1 The Early History of Chemistry

- A. Take notes: Outline the early history of chemistry from 400 BC through Priestly. Include important people, contributions, and vocabulary
- B. Memorize/Flashcards - n/a
- C. Practice Problems
  1. Describe the contributions of Joseph Priestly, his relationship to Benjamin Franklin, and why he left England.

## 2.2 Fundamental Chemical Laws

- A. Take notes: Define and give an example of each law:
  - Law of Conservation of Mass
  - Law of Definite Proportion (Proust's Law)
  - Law of Multiple Proportions

B. Memorize/Flashcards - n/a

C. Practice Problems

2. In the illustration at right, two substances massed prior to a chemical reaction. After the two substances are combined, a white precipitate is formed in an aqueous solution. If the substances are again massed, what will the new mass be? Which chemical law is demonstrated in this example?



## 2.3 Dalton's Atomic Theory

- A. Take notes: Four parts of Dalton's Atomic Theory
- B. Memorize/Flashcards – Seven elements that occur as diatomic molecules (pg. 50 in margin). **Hint: Use a mnemonic device like 'I Have No Bright Or Clever Friends'**
- C. Practice Problems - n/a

## **2.4 Early Experiments to Characterize the Atom**

A. Take notes:

- J.J. Thomson, cathode-ray tubes, and discovery of electron
- Henri Becquerel, radiation, gamma rays, alpha and beta particles
- Ernest Rutherford, gold foil experiment, discovery of nucleus

B. Memorize/Flashcards - n/a

C. Practice Problems

3. What evidence led to the conclusion that cathode rays had a negative charge?
4. Consider Ernest Rutherford's gold foil experiment illustrated in Fig. 2.12. How did the results of this experiment lead Rutherford away from the plum pudding model of the atom to propose the nuclear model of the atom?

## **2.5 The Modern View of Atomic Structure: An Introduction**

A. Take notes

- Neutron, proton, electron – mass, charge, location in atom
- Define atomic number, mass number, isotope
- Symbol used to show atoms and their mass and atomic numbers

B. Memorize/Flashcards - n/a

C. Practice Problems

5. T or F      The chemical properties of element arise from their neutrons
6. T or F      In nature, most elements exist as mixtures of their isotopes
7. Write the symbol for an element with 85 protons, 125 neutrons, and 85 protons
8. Use your periodic table to determine the number of protons, neutrons, and electrons in the following elements:

Mg

U

Fe

Rn

## **2.6 Molecules and Ions**

A. Take notes:

- Define chemical bond
- Define, relate, and give examples of: covalent bonds, molecule, chemical formula, structural formula
- Define and relate: ionic bond, ion, anion, cation

B. Memorize/Flashcards - n/a

C. Practice Problems

9. Which of the following explain how an ion is formed? Explain your choice
- a. adding or subtracting protons to/from an atom
  - b. adding or subtracting neutrons to/from an atom
  - c. adding or subtracting electrons to/from an atom

10. Circle which of the following elements would form a cation:

I      Ca      Rb      Ne      Ni      O

## **2.7 An Introduction to the Periodic Table**

A. Take notes:

- Physical and chemical properties of metals
- Physical and chemical properties of nonmetals
- Define group (family) and period

B. Memorize/Flashcards - n/a

C. Practice Problems

11. Cut out the periodic table on the last page of the notes, tape it into your notebook, and color-code and/or label the following special groups or periods of the periodic table: alkali metals, alkaline earth metals, halogens, noble gases, transition metals, lanthanides, actinides, line separating metals from non-metals, metalloids/semimetals, diatomic elements

## 2.8 Naming Simple Compounds

### A. Take notes:

- Rules for naming Binary Ionic Compounds (Type I)
- How to name Binary Ionic Compounds (Type II)
- Naming Ionic Compounds with Polyatomic Ions
  
- Naming Binary Covalent Compounds (Type III)
- Naming acids

### B. Memorize/Flashcards

- Table 2.6 – Prefixes Used to Indicate Number in Chemical Names
- Common Polyatomic Ions – **know formula AND charge for:** sulfate, sulfite, hydrogen sulfate, phosphate, dihydrogen phosphate, hydrogen phosphate, nitrite, nitrate, ammonium, thiocyanate, carbonate, hydrogen carbonate, bicarbonate, borate, chromate, dichromate, permanganate, oxalate, amide, cyanide, hydroxide, acetate, peroxide, hypochlorite, chlorite, chlorate, perchlorate, thiosulfate

### C. Practice Problems

12. Name the following compounds:

- CuI \_\_\_\_\_
- CuI<sub>2</sub> \_\_\_\_\_
- CoI<sub>2</sub> \_\_\_\_\_
- Na<sub>2</sub>CO<sub>3</sub> \_\_\_\_\_
- NaHCO<sub>3</sub> \_\_\_\_\_
- S<sub>4</sub>N<sub>4</sub> \_\_\_\_\_
- SeCl<sub>4</sub> \_\_\_\_\_
- NaOCl \_\_\_\_\_
- BaCrO<sub>4</sub> \_\_\_\_\_
- NH<sub>4</sub>NO<sub>3</sub> \_\_\_\_\_

13. Write formulas for the following:

- sulfur difluoride \_\_\_\_\_
- sulfur hexafluoride \_\_\_\_\_
- sodium dihydrogen phosphate \_\_\_\_\_
- lithium nitride \_\_\_\_\_
- chromium (III) carbonate \_\_\_\_\_
- tin (II) fluoride \_\_\_\_\_
- ammonium acetate \_\_\_\_\_
- cobalt (III) nitrate \_\_\_\_\_
- potassium chlorate \_\_\_\_\_
- sodium hydride \_\_\_\_\_
- calcium phosphate \_\_\_\_\_

Chapter 2 Challenge Problems: Solve on Loose-Leaf and attach work to this packet: #103, 104, 108, 110, 111, 114, 116, 119, 120, 122

AP Multiple Choice Review #1-16 (answers below)

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Periodic Table of the Elements**

																18 VIIIA 8A									
1																									
1A 1A																									
2																									
2A 2A																									
3																									
3A 3A																									
4																									
4A 4A																									
5																									
5A 5A																									
6																									
6A 6A																									
7																									
7A 7A																									
8																									
8A 8A																									
9																									
9A 9A																									
10																									
10A 10A																									
11																									
11A 11A																									
12																									
12A 12A																									
13																									
13A 13A																									
14																									
14A 14A																									
15																									
15A 15A																									
16																									
16A 16A																									
17																									
17A 17A																									
18																									
18A 18A																									
19																									
19A 19A																									
20																									
20A 20A																									
21																									
21A 21A																									
22																									
22A 22A																									
23																									
23A 23A																									
24																									
24A 24A																									
25																									
25A 25A																									
26																									
26A 26A																									
27																									
27A 27A																									
28																									
28A 28A																									
29																									
29A 29A																									
30																									
30A 30A																									
31																									
31A 31A																									
32																									
32A 32A																									
33																									
33A 33A																									
34																									
34A 34A																									
35																									
35A 35A																									
36																									
36A 36A																									
37																									
37A 37A																									
38																									
38A 38A																									
39																									
39A 39A																									
40																									
40A 40A																									
41																									
41A 41A																									
42																									
42A 42A																									
43																									
43A 43A																									
44																									
44A 44A																									
45																									
45A 45A																									
46																									
46A 46A																									
47																									
47A 47A																									
48																									
48A 48A																									
49																									
49A 49A																									
50																									
50A 50A																									
51																									
51A 51A																									
52																									
52A 52A																									
53																									
53A 53A																									
54																									
54A 54A																									
55																									
55A 55A																									
56																									
56A 56A																									
57-71																									
57-71A 57-71A																									
72																									
72A 72A																									
73																									
73A 73A																									
74																									
74A 74A																									
75																									
75A 75A																									
76																									
76A 76A																									
77																									
77A 77A																									
78																									
78A 78A																									
79																									
79A 79A																									
80																									
80A 80A																									
81																									
81A 81A																									
82																									
82A 82A																									
83																									
83A 83A																									
84																									
84A 84A																									
85																									
85A 85A																									
86																									
86A 86A																									
87																									
87A 87A																									
88																									
88A 88A																									
89-103																									
89-103A 89-103A																									
104																									
104A 104A																									
105																									
105A 105A																									
106																									
106A 106A																									
107																									
107A 107A																									
108																									
108A 108A																									
109																									
109A 109A																									
110																									
110A 110A																									
111																									
111A 111A																									
112																									
112A 112A																									
113																									
113A 113A																									
114																									
114A 114A																									
115																									
115A 115A																									
116																									
116A 116A																									
117																									
117A 117A																									
118																									
118A 118A																									
119																									
119A 119A																									
120																									
120A 120A																									
121																									
121A 121A																									
122																									
122A 122A																									
123																									
123A 123A																									
124																									
124A 124A																									
125																									
125A 125A																									
126																									
126A 126A																									
127																									
127A 127A																									
128																									
128A 128A																									
129																									
129A 129A																									
130																									
130A 130A																									
131																									
131A 131A																									
132																									
132A 132A																									
133																									
133A 133A																									
134																									
134A 134A																									
135																									
135A 135A																									
136																									
136A 136A																									
137																									
137A 137A																									
138																									
138A 138A																									
139																									
139A 139A																									
140																									
140A 140A																									
141																									
141A 141A																									
142																									
142A 142A																									
143																									
143A 143A																									
144																									
144A 144A																									
145																									
145A 145A																									
146																									
146A 146A																									
147																									
147A 147A																									
148																									
148A 148A																									
149																									
149A 149A																									
150																									
150A 150A																									
151																									
151A 151A																									
152																									
152A 152A																									
153																									
153A 153A																									
154																									
154A 154A																									
155																									
155A 155A																									
156																									
156A 156A																									
157																									
157A 157A																									
158																									
158A 158A																									
159																									
159A 159A																									
160																									
160A 160A																									
161																									
161A 161A																									
162																									
162A 162A																									
163																									
163A 163A																									
164																									
164A 164A																									
165																									
165A 165A																									
166																									
166A 166A																									
167																									
167A 167A																									
168																									
168A 168A																									
169																									
169A 169A																									
170																									
170A 170A																									
171																									
171A 171A																									
172																									
172A 172A																									
173																									
173A 173A																									
174																									
174A 174A																									
175																									
175A 175A																									
176																									
176A 176A																									
177																									
177A 177A																									
178																									
178A 178A																									
179																									
179A 179A																									
180																									
180A 180A																									
181																									
181A 181A																									
182																									
182A 182A																									
183																									
183A 183A																									
184																									
184A 184A																									
185																									
185A 185A																									
186																									
186A 186A																									
187																									
187A 187A																									
188																									
188A 188A																									
189																									
189A 189A																									
190																									
190A 190A																									
191																									
191A 191A																									
192																									
192A 192A																									
193																									
193A 193A																									
194																									
194A 194A																									
195																									
195A 195A																									
196																									
196A 196A																									
197																									
197A 197A																									
198																									
198A 198A																									
199																									
199A 199A																									
200																									
200A 200A																									
201																									
201A 201A																									
202																									
202A 202A																									
203																									
203A 203A																									
204																									
204A 204A																									
205																									
205A 205A																									
206																									
206A 206A																									
207																									
207A 207A																									
208																									
208A 208A																									
209																									
209A 209A																									
210																									
210A 210A																									
211																									
211A 211A																									
212																									
212A 212A																									
213																									
213A 213A																									
214																									
214A 214A																									
215																									
215A 215A																									
216																									
216A 216A																									
217																									
217A 217A																									
218																									
218A 218A																									
219																									
219A 219A																									
220																									
220A 220A																									
221																									
221A 221A																									
222																									
222A 222A																									
223																									
223A 223A																									
224																									
224A 224A																									
225																									
225A 225A																									

## Chapter 3: Stoichiometry

### **3.1 Counting by Weighing** – Read this section

### **3.2 Atomic Masses**

#### A. Take notes:

- Modern system of atomic mass and the use of the mass spectrometer
- Define isotope
- Average atomic mass – define and how to calculate (I called this a weighted average in Unit 3 of Chemistry)

#### B. Memorize/Flashcards - n/a

#### C. Practice Problems

1. An element consists of 1.40% of an isotope with mass 203.973 u, 24.10% of an isotope with mass 205.9745 u, 22.10% of an isotope with mass 206.9759 u, and 52.40% of an isotope with mass 207.9766 u. Calculate the average atomic mass, AND identify the element.

### **3.3 The Mole**

#### A. Take notes:

- Mole, definition and relate to Avogadro's number

#### B. Memorize/Flashcards - n/a

#### C. Practice Problems - n/a



### **3.4 Molar Mass**

A. Take notes:

- Define molar mass, unit of molar mass
- Work through Interactive Examples 3.6 – 3.8. Also refer to Unit 9 of Chemistry. Take notes as needed

B. Memorize/Flashcards - ***\*\*We will be rounding all molar masses to the nearest hundredth.***

C. Practice Problems

2. Calculate the mass 500. atoms of iron
3. A diamond contains  $5.0 \times 10^{21}$  atoms of carbon. How many moles of carbon is this?
4. Aluminum metal is produced by passing an electric current through a solution of aluminum oxide ( $\text{Al}_2\text{O}_3$ ) dissolved in molten cryolite ( $\text{Na}_3\text{AlF}_6$ ). Calculate the molar mass of each substance.
5. a. Calculate the molar mass of calcium phosphate,  $\text{Ca}_3(\text{PO}_4)_2$   
  
b. How many moles would be in 1.00 gram of calcium phosphate?
6. Freon-12 ( $\text{CCl}_2\text{F}_2$ ) is used as a refrigerant in air conditions. Calculate the number of molecules of Freon-12 in 5.56 mg of Freon-12.

### **3.5 Learning to Solve Problems** – Read this section

### **3.6 Percent Composition of Compounds**

A. Take notes:

- Percent composition/mass percent
- Example of how to find percent composition

B. Memorize/Flashcards - n/a

C. Practice Problems

7. Calculate the percent composition by mass of baking soda, aka sodium bicarbonate.

8. In 1987 the first substance to act as a superconductor at a temperature above that of liquid nitrogen (77K) was discovered. The formula of this substance is  $\text{YBa}_2\text{Cu}_3\text{O}_7$ . Calculate the percent composition by mass of Yttrium in this substance.

### **3.7 Determining the Formula of a Compound**

A. Take notes:

- Define empirical formula; steps for determining empirical formula
- Define molecular formula; steps for determining molecular formula

B. Memorize/Flashcards - n/a

C. Practice Problems

9. A compound containing only sulfur and nitrogen is 69.6% by mass. What is the empirical formula of the compound?

10. Determine the molecular formula of a compound that contains 26.7% P, 12.1% N, and 61.2% Cl, and has a molar mass of 580 g/mol.

### **3.8 Chemical Equations**

- A. Take notes:
- Define reactants and products; use an example to identify reactants and products in an equation
- B. Memorize/Flashcards – symbols (and their meanings) used to identify physical states (solid, liquid, gas, aqueous solution)
- C. Practice Problems - n/a

### **3.9 Balancing Chemical Equations**

- A. Take notes:
- If you can find your notes for ‘Tips & Tricks for Balancing Equations’, it would be a good idea to fill them in. If not, consider leaving a space and we will fill them in as a class.
- B. Memorize/Flashcards - n/a
- C. Practice Problems
11. Write out AND balance the equations in # 102 on pg. 131
- a.
- b.
- c.
- d.

12. Liquid silicon tetrachloride is reacted with very pure solid magnesium, producing solid silicon and solid magnesium chloride. Write a complete, balanced equation for this reaction using proper symbols:

### **3.10 Stoichiometric Calculations: Amounts of Reactants and Products**

A. Take notes:

- Read the section and follow examples 3.15 and 3.16. Also refer to the Problem-Solving Strategy on pg. 111.

B. Memorize/Flashcards - n/a

C. Practice Problems – refer to page 132 and complete the following:

105. What mass of iron (III) oxide with sufficient aluminum must be used to produce 15.0 g of iron?

106. Complete as is – don't forget to balance the equation first!

109. Complete a.

### **3.11 The Concept of Limiting Reactants**

- A. Take notes – Read this section. This is our starting point in fall!
- Define limiting reactant – leave a page or two for more notes on this
  - Define theoretical yield, actual yield (a.k.a. experimental yield), percent yield
  - Formula for calculating percent yield

B. Memorize/Flashcards - n/a

#### C. Practice Problems

13. A reaction with a theoretical yield of 9.23 g produced 7.89 g of product. What is the percent yield for this reaction?

14. 5.96 g of ammonia (NH<sub>3</sub>) reacts completely according to the following reaction:



After running the reaction in lab, 10.2 g of urea (CN<sub>2</sub>OH<sub>4</sub>) is formed. What is the percent yield for the reaction?

Chapter 3 Challenge Problems: Solve on loose-leaf and attach work to this packet. #149, 161, 162, 163, 164, 173, 183, 184

AP Multiple Choice Review Questions #1-17 (answers below)

- |    |     |
|----|-----|
| 1. | 10. |
| 2. | 11. |
| 3. | 12. |
| 4. | 13. |
| 5. | 14. |
| 6. | 15. |
| 7. | 16. |
| 8. | 17. |
| 9. | 18. |