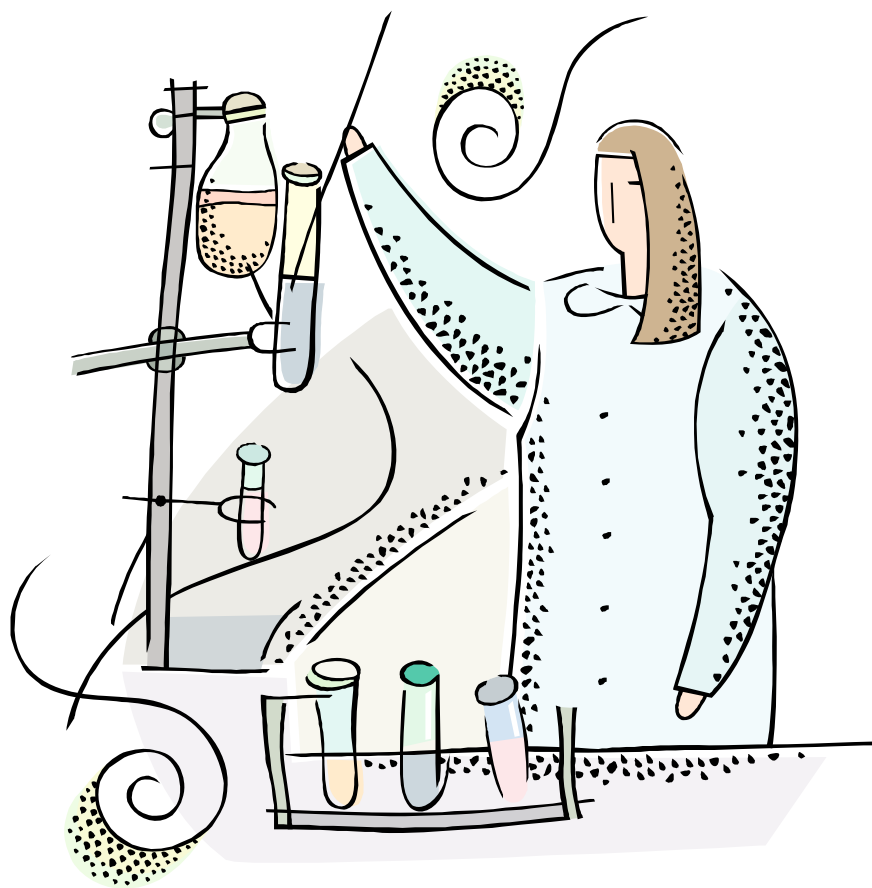


AP CHEMISTRY:

SUMMER 2008



SUMMER ASSIGNMENT 2008 - AP CHEMISTRY:

- 1) You will need the textbook "Chemistry" -5th edition (2000) by Steven and Susan Zumdahl. Textbooks can be checked out at the CSHS front office. (BE SURE you are NOT given the Pre-AP text, "Chemistry" from Glenco/McGraw Hill publishers.)
- 2) Before the first day of school (August 25th) each student should:
 - a) Read chapters 1-3 as well as sections 4.1-4.7 from chapter 4 in the textbook (This material should be review).
 - b) Complete the attached review sheet. Bring this completed review with you **THE FIRST DAY OF CLASS**. You will receive a grade per chapter so it is important to work through the entire review to the best of your ability.
 - c) Be sure to show all your work for math problems unless a simple calculator step is all that is required. Complex, multi-step math problems showing answers only **WILL NOT RECEIVE CREDIT! No exceptions!!**
 - d) Place a **BOX AROUND THE FINAL ANSWER** to any math question for quick grading.
 - e) Answers must always be given with the correct # of sig figs **AND** the correct units for credit. **No exceptions!!**
 - f) Make note of any topics and/or problems on which you have questions. We move **VERY** quickly through these four chapters of review material unless students have questions.
- 3) Memorize **ALL** element symbols and their most common valence charges, as well as the polyatomic ions and their valences. The textbook assumes you know this information from the beginning of the year. (This should only be a review for you from pre-AP Chemistry.)
- 4) Memorize the solubility rules. The textbook assumes you will know these from the beginning of the year. A list of these rules is provided in the Zumdahl text, Table 4.1 on pg. 150. (This should only be a review for you from pre-AP Chemistry.)
- 5) A test covering summer material will be given within the first three weeks of class.

AP Chemistry is a challenging course. Students who want to succeed must come to class each day prepared - reading and homework assignments **MUST be completed. Labs are an integral part of this course, about 20 procedures are required! Emphasis is placed on various techniques, improving lab skills, and writing formal lab reports in a bound notebook. All exams are timed, in the AP format, with AP grading in place. Exams will be worth 70% of your grade.**

Enjoy your summer and come to class in August ready to have fun in Chemistry!!

2008 SUMMER REVIEW PROBLEMS:

CHAPTER #1

1. List the fundamental S.I.units combined to get the following derived units:

- a) Velocity
- b) Acceleration
- c) Specific heat
- d) density
- e) pressure

2. Put the following prefixes in order from SMALLEST to LARGEST:

femto, tera, mega, deci, kilo, atto, exa

3. Put the following prefixes in order from SMALLEST to LARGEST:

giga, hector, micro, peta, milli, nano, pico

4. How many significant figures are there in each of the following values?

- a) 6.07×10^{-15} _____
- b) 0.003840 _____
- c) 17.00 _____
- d) 8×10^8 _____
- e) 463.8052 _____
- f) 1406.20 _____
- g) 0.0007 _____
- h) 1600.0 _____

5. Perform the indicated calculations on the following measured values, giving the final answer with the correct number of significant figures.

- a) $15.91 + 3.2257 =$
- b) $324.6 \times 815.991 =$
- c) $(3.8 \times 10^{-12} + 4 \times 10^{-13}) (4 \times 10^{12} + 6.3 \times 10^{13}) =$
- d) $3.14159 \times 68 / (5.18 \times 10^{-11} - 6 \times 10^{-4}) =$
- e) $1.65 \times 14 =$
- f) $27 / 4.148 =$
- g) $6.404 \times 2.91 \times (18.7 - 17.1) =$

6. If you place 8 gallons of gas in your car and it cost you a total of \$9.20, what is the cost of gas per liter?

7. A runner can run a 5.0 kilometer race in a time of 21 minutes and 22 seconds.

a) What is the runner's speed in miles per hour?

b) How long did it take for the runner to complete one mile?

8. A "joule", like a calorie, is a unit of energy. There are 4.184 joules per calorie. How many joules of energy are available in one ounce of Frosted Flakes which has 120,000 calories? (Note: A Food Calorie is actually one kilocalorie and is noted by using a capital "C")

9. During a baseball game a pitcher threw a fastball with a velocity of 93.7 mph.

a) Calculate the velocity in meters / second.

b) Calculate how long it took this pitch to travel from the mound to home plate, a distance of 60 feet and 6 inches.

10. Perform the following temperature conversions:

a) 300K to °F

b) 300 °F to K

c) -40 °F to °C

d) -100 °C to K

e) 1555K to °C

f) 0.0 K to °F

g) 16 °C to °F

11. The density of an object is 1.63 g/ mL. Its volume is 0.271 L. What is the mass of this object?

12. The density of Earth is about 3.5 g/cm³. If the Earth has a radius of 7000 miles, what is its mass? (Volume = $4 \pi r^3/3$).

13. Define the following:

a) mixture

b) pure substance

c) homogeneous

d) Heterogeneous

CHAPTER #2

1. In an exothermic reaction (heat produced) chlorine reacts with 2.0200 g of hydrogen to form 72.926 g of hydrogen chloride gas. How many grams of chlorine reacted with the hydrogen?

2. A sample of H_2SO_4 contains 2.02 g of hydrogen, 32.07 g of sulfur and 64 g of oxygen. How many grams of sulfur are present in a second sample of H_2SO_4 containing 7.27 g of hydrogen?

3. Identify each of the following elements:

a) $\begin{matrix} 91 \\ 40 \end{matrix}$ X

b) $\begin{matrix} 108 \\ 47 \end{matrix}$ X

c) $\begin{matrix} 133 \\ 55 \end{matrix}$ X

d) $\begin{matrix} 85 \\ 36 \end{matrix}$ X

4. How many protons and neutrons are in each of the following elements?

a) ^{227}Ac

b) ^{70}Ga

c) ^{251}Cf

d) ^{64}Cu

5. How many protons, neutrons and electrons are in each of the following ions?

a) $^{56}\text{Fe}^{3+}$

b) $^{31}\text{P}^{3-}$

c) $^{19}\text{F}^-$

d) $^{127}\text{I}^{7+}$

6. Name the family to which each element belongs:

a) Fe

b) Cl

c) Mg

d) Ar

7. Given the position in the periodic table, what is the most likely oxidation state each element will have when forming ions?

- | | |
|-------|-------|
| a) Ca | d) K |
| b) N | e) Al |
| c) Br | f) S |

8. An element combines with 2 atoms of chlorine to form an ionic compound. The element has 20 neutrons in its most abundant form. Write the formula of this compound.

9. Name each of the following compounds:

- a) PbI_2
- b) NH_4Cl
- c) Fe_2O_3
- d) LiH
- e) CsCl
- f) OsO_4
- g) $\text{Cr}(\text{OH})_3$
- h) $\text{NaC}_2\text{H}_3\text{O}_2$
- i) $\text{K}_2\text{Cr}_2\text{O}_7$
- j) SO_3
- k) HNO_2
- l) P_4H_{10}
- m) KHCO_3
- n) HF
- o) Ce_2O_3
- p) HCN

10. Write formulas for each of the following compounds:

- a) rubidium sulfate**
- b) tin (II) fluoride**
- c) sodium hydrogen sulfate**
- d) iron (III) oxide**
- e) magnesium hypochlorite**
- f) cesium aluminum hydride**
- g) ammonium acetate**
- h) hydrobromic acid**
- i) potassium permanganate**
- j) copper (I) oxide**
- k) nitric acid**
- l) carbon tetrachloride**
- m) rubidium nitrate**
- n) dinitrogen tetroxide**
- o) tin (IV) oxide**
- p) sulfuric acid**
- q) lithium chlorate**
- r) aluminum iodate**
- s) barium chloride**
- t) hydrosulfuric acid**
- u) potassium hydrogen phosphate**

- 5. How many sodium ions are present in each of the following?**
- a) 2 moles of sodium phosphate**

 - b) 5.8 grams of sodium chloride**
- 6. If 0.172 moles of baking soda (NaHCO_3) were used to bake a chocolate cherry cake, how many grams of baking soda would the recipe call for?**
- 7. Bauxite, the principle ore used in the production of aluminum cans, has a molecular formula of $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$**
- a) Determine the molar mass of bauxite.**

 - b) How many grams of Al are in 0.58 moles of bauxite?**

 - c) How many atoms of Al are in 0.58 moles of bauxite?**

 - d) What is the mass in grams of 2.1×10^{24} formula units of bauxite?**

8. Calculate the mass percent of each element in $C_5H_{10}O$

a) C :

b) H:

c) O:

9. Which of the following formulas can NOT be empirical formulas?

a) CH_4

d) N_2O_5

g) Sb_2S_3

b) CH_2

e) B_2H_6

h) N_2O_4

c) $KMnO_4$

f) NH_2Cl

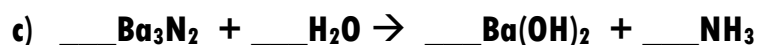
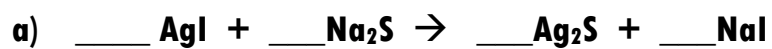
g) CH_2O

10. The analysis of a rocket fuel showed it contained 87.4% nitrogen and 12.6% hydrogen by weight. Mass spectral analysis showed the fuel to have a molar mass of 32.05 grams.

a) What is the empirical formula of this fuel?

b) What is the molecular formula of this fuel?

11. Balance the following chemical equations:



12. How many grams of water vapor can be generated from combusting of 18.74 g of ethanol? $\text{C}_2\text{H}_6\text{O} (\text{g}) + \text{O}_2 \rightarrow \text{CO}_2 (\text{g}) + \text{H}_2\text{O} (\text{g})$ (unbalanced!)

14. How many grams of oxygen are necessary to completely react with 22.8 grams of methane, CH_4 ? (Begin by writing a balanced equation for this combustion reaction!)

15. A reaction begins by combining 64.81 g of silver nitrate with 92.67 grams of potassium bromide.

- a) Write the balanced equation for this reaction.
- b) How much silver bromide is formed?
- c) Which reactant is the limiting reagent?
- d) Which reactant is in excess?
- e) How much of the excess reactant remains after this reaction?
- f) If the actual yield of silver bromide were 14.77 g, what was the percent yield?

CHAPTER #4

1. Write dissociation equations for the following when they are dissolved in water:

- a) $\text{Na}_2\text{SO}_4(\text{s})$
- b) $\text{KCl}(\text{s})$
- c) $\text{NaOH}(\text{s})$
- d) $\text{Na}_2\text{CrO}_4(\text{s})$

2. Calculate the molarity of the following solutions:

- a) 18.92 g of HNO_3 in enough water to make 500 mL of solution
- b) 5.761 g of KOH in enough water to make 350 mL of solution
- c) 72.06 g of BaCl_2 in enough water to make 800 mL of solution

3. Describe how to prepare the following solutions:

a) 1.5 L of 0.5 M $\text{K}_2\text{Cr}_2\text{O}_7$

b) 250 mL of 1.0 M Na_2SO_4

4. Describe how to prepare the solution below from a previously made solution of the given concentrations:

a) 500 mL of 1.5 M NaCl from 7.3 M NaCl

b) 750 mL of 0.05 M FeSO_4 from 0.1 M FeSO_4

5. What is the concentration of the following in ppm? (1 ppm = 1 mg/ L of solution)

a) 6.2×10^{-3} g Be^{+2} in 750 mL of solution

b) 255 mg NaIO_3 in 1.5 L of solution

6. Complete and balance the following equations:

a) $\underline{\hspace{1cm}} \text{NaCl (aq)} + \underline{\hspace{1cm}} \text{Hg}_2(\text{NO}_3)_2 \text{ (aq)} \rightarrow$

b) $\underline{\hspace{1cm}} \text{Ca(OH)}_2 \text{ (aq)} + \underline{\hspace{1cm}} \text{Na}_2\text{CO}_3 \text{ (aq)} \rightarrow$

7. A solution contains Pb^{2+} , Ag^+ and Fe^{3+} You want to precipitate the Pb^{2+} selectively. What anion would you choose?