

LATE packets = 0

+1 each side correct

THINGS YOU SHOULD KNOW

Basic metric

1 base unit = 100 centiunits

1 base unit = 1000 milliunits

1 kilo unit = 1000 base units

Examples:

1 g = 100 cg

1 L = 1000 mL

1 km = 1000 m

1000 g = 1 kg

You should be able to:

- Work with scientific notation
- Define & apply significant figures with in a calculation
- Perform metric conversions via dimensional analysis (SYW!)
- Define matter & solve density problems
- Identify properties of the periodic table and elements
- Write formulas and name compounds (use ion sheet to look up ion name & its charge)
- Write and balance equations
- Identify 5 reaction types
- Calculate molar mass of a compound
- Perform gram, mole, particles conversions
- Calculate percent composition of an element in a compound
- Determine empirical and molecular formulas

Notes for final exam:

The format for your final exam is multiple choice and short answer questions.

The exam is worth 20% of your final grade.

- You are allowed 1 sheet of $8 \frac{1}{2} \times 11$ (computer size) paper. You may write anything you deem necessary on the **front side only** to be used on the exam.
- Informational sheet **MAY NOT BE TYPED**, rather it must be hand-written.
- The "informational sheet" must be your own work. It will have your name written on the back and collected at the end of the final. This must be turned in to the instructor in order to receive a grade for the exam.
- A periodic table and an ion chart will be provided for the exam.
- Bring several no. 2 pencils, a calculator with spare batteries, and something to do quietly after the exam.
- **You may not share calculators from a classmate, nor will the instructor lend you a calculator. You may also not store information on your calculator. This is considered academic dishonesty, which results in a zero on the final.**

Good luck on your reviewing voyage. I HIGHLY suggest doing a little bit each day. I have made this review all inclusive so there is more practice and review rather than less. This packet is to be completed with no more than 1 person and will be collected for extra credit. Any academic dishonesty will result in a zero and a referral for all involved.

*Use this review as a tool to aid in your quest to master your understanding of
Chemistry for the final.*

GOOD LUCK!

Semester One Chemistry Review 2011-2012

****Study your notes, book, labs, and assignments. You should be able to do all of the following with one sheet of notes/formulas*

Unit 1: Scientific method, sig figs, scientific notation, and conversions
(CP Ch 1 & 3) (Hon Ch 1 & 2)

1. Convert the following:

a. 23 mm to m

b. 45 hL to dL

2. Convert to scientific notation:

a. 45000000

b. 0.00000687

3. Convert to the decimal:

a. 2.3×10^3

b. 6.7×10^{-7}

4. How many significant figures in the following:

a. 2020 cm

b. 404.0 kg

c. 0.0098 dL

5. Perform the following calculations using the correct number of significant figures in the answer.

a. $6.7 \text{ m} \times 450001 \text{ m}$

b. $56.6 \text{ g} + 45 \text{ g}$

c. $3.3 \times 10^4 / 1.9 \times 10^{-2}$

6. Convert the following:

a. 410 s to days

b. 56.7 in to cm

7. Solve the following:

- a. Given a mass of 67 g and a volume of 45 mL, what is the density?

- b. Given a density of 56 g/mL and a volume of 23 mL, what is the mass?

8. List the steps of the scientific method.

Unit 2: Matter & Energy (CP: Ch 2, 13, & 17) (Hon: Ch 1 & 4)

1. What are the three states of matter and how can you tell them apart?

2. Provide 6 observations that would show a chemical change has occurred.

Ex: light being emitted

3. Identify each of the following as an element, compound, heterogeneous, or homogeneous mixture.

- a. Gasoline

- b. Air

- c. Silver

- d. chocolate chip cookie

4. Classify the following as physical or chemical changes.
- Mothballs gradually vaporizing in a closet
 - A piece of rubber stretches when you pull it
 - Whole milk curdles when you add vinegar to it
5. Express 60.1 cal of energy in unit of Joules. Given: $4.18 \text{ J} = 1 \text{ cal}$
6. How many calories of energy correspond to 28.4 J? Given: $4.18 \text{ J} = 1 \text{ cal}$
7. The heat required to raise the temperature of a 46 g piece of metal at 12°C to a final temperature of 73°C is 49870 J. What is the specific heat of the metal?
8. Calculate the heat energy needed to heat a 800 g copper frying pan from 25°C to 490°C (use the $q=mc\Delta T$ equation...this will not be given on final!)
9. What are three differences between an exothermic and endothermic reaction? Check your notes or text for this answer.
10. Draw **and** label a potential energy diagram for an exothermic reaction and an endothermic reaction.

11. What are the parts of a heating curve? Draw one! Label the following on the curve:

Title, label axes with temp. ($^{\circ}\text{C}$) and time (min), solid, liquid, and gas, melting point/freezing point, boiling point/condensing point, kinetic energy changes, potential energy changes, no ΔT .

Unit 3: History of the Atom & Periodic Table (CP: Ch 4 & 6) (HON: Ch 3 & 5)

1. Describe the periodic table of elements. How are they arranged in a table? What significance is there in the way elements are arranged into vertical groups?

2. Give the symbol and atomic number for each of the following elements. Also indicate whether each element is a metal or a nonmetal and its family name if it is a member of a family.

a. Iodine

b. Magnesium

c. Lithium

3. List the characteristic physical properties that distinguish metals from nonmetals. Tell what side of the periodic table they both belong to.

4 a) What is the periodic trend for reactivity? In other words, what is the most reactive metal and what is the most reactive nonmetal?

b) What happens when a metal from the alkali metal family reacts with water? (demo performed by teacher)

5.

Subatomic Particle	Mass (amu)	Charge	Location within Atom

6. Neon has two main isotopes:

Average atomic mass = [abundance as decimal A x mass isotope A] +
[abundance as decimal B x mass isotope B]

Neon-20 is 91% and has a mass of 20.00 amu

Neon-22 is 9% and has a mass of 22.00 amu

Calculate the average atomic mass.

7. Define an isotope. Write the complete atomic symbol for carbon - 12 and carbon - 13.

8. Complete the following table. Be careful, these could be atoms or ions!!!

Name	Symbol	Atomic number	Mass number	# of neutrons	# of electrons	# of protons
sodium		11	23 amu			
	Cl					
Nitrogen					7	
	Fe			30		
	Ag					
Argon						
Lithium cation	Li ⁺¹	3	7 amu	4	2	
Nitride anion	N ⁻³	7				7

Unit 4: Naming Ionic and Covalent Compounds (CP: Ch 9) (HON: Ch 6)

Define ionic compounds:

Define covalent (molecular) compounds:

Identify where metals and nonmetals are located on the periodic table.

1. Ions: Write the name or formula for the following ions: (use ion chart)

Ion name	Ion formula
Oxide anion	
	F ⁻¹
Magnesium ion	
	Na ⁺¹
Ammonium ion	
	(SO ₄) ⁻²

2. What are the properties of ionic compounds that tell them apart from molecular compounds?

3. Indicate whether the compound is ionic or molecular? (you will need to look at a periodic table to determine this)

a) LiF

b) MgI_2

c) N_2O_4

4. Identify the type of compound, write the name or chemical formula for each compound:

Covalent/molecular or Ionic	Name of compound	Chemical Formula
	Carbon dioxide	
		S_4N_2
	Sulfur difluoride	
		ICl_5
	Tetraboron hexahydride	
		$CaCl_2$
	Cesium phosphide	
		Al_2O_3
	Zinc oxide	
		CuO
	Ammonium chloride	
	Iron III sulfide	

Unit 5: Balancing Equations & Chemical Reactions (CP: Ch 11) (HON: Ch 8)

1. Match the type of reaction with the phrase that best describes it.

_____ a) Double replacement

A) oxygen and a substance react

_____ b) Combustion

B) a single reactant

_____ c) Decomposition

C) two ionic compounds react

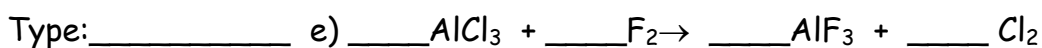
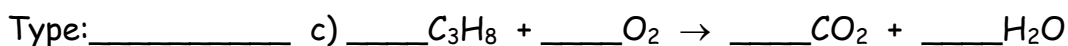
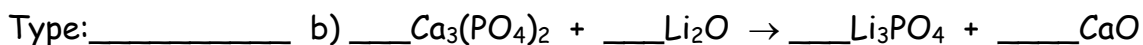
_____ d) Single replacement

D) a single product

_____ e) Synthesis/Combination

E) an element and a compound react

2. Balance the following equations AND give type of reaction



3. Write a balanced equation **AND** give reaction type

a) A piece of magnesium is placed in a solution of iron (III) sulfate and produces magnesium sulfate and iron.

Reaction type _____

Word equation:

Balanced chemical equation:

b) A solution of barium chloride is added to a solution of potassium sulfate and produces barium sulfate and potassium chloride.

Reaction type _____

Word equation:

Balanced chemical equation:

c) Hydrogen gas and oxygen gas combine to form dihydrogen monoxide.

Reaction type _____

Word equation:

Balanced chemical equation:

Unit 6: The Mole (CP: Ch 10) (HON: Ch 7)

1. Find the molar mass of the following: (round all masses to the hundredths place). Units on molar mass are g/mol.

a) KI

b) $\text{Mg}(\text{OH})_2$

2. How many molecules are in 3.0 moles of SO_2 ?

3. Calculate the number of moles in 32.0 g of CH_4 (hint: must find molar mass of CH_4).

4. What mass does 3.0×10^{20} formula units (particles) of Lithium Oxide have? Remember to find charges, then criss cross for the formula of lithium oxide.

5. How many hydrogen atoms are there in 5 molecules of H_2O ?

I.e: 1 molecule = 2 H atoms (use dimensional analysis)

6. Determine the percent composition of each element for the following compounds:

a) LiBr

b) BaSO_4

7. Given a sample that is composed of 6.0 g C and 1.5 g H, and is known to have a molar mass of 30.0 g:

a) Determine its empirical formula.

REMEMBER THE POEM: PERCENT TO MASS

MASS TO MOLE

DIVIDE BY THE SMALLEST

MULTIPLY 'TIL WHOLE

b) Determine its molecular formula.

(molecular mass/mass of empirical formula) = answer tells you how many times more atoms there are in the actual formula. So multiply the answer by the subscripts in the empirical formula.

8. Find the empirical formula of a compound that is 47.9% zinc and 52.1% chlorine.