

Chemistry - Mid Term Exam Review Sheet #1

The midterm exam covers chapters 1 - 4 & 9 - 11. You should read through each chapter, look over old tests you still have, answer the following questions and do the calculations in order prepare yourself for the mid-term.

1. Define the following terms and describe where each is located.

- proton - _____
- neutron - _____
- electron - _____

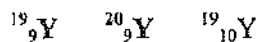
2. Complete the following table:

Element name	Atomic #	Mass #	# of protons	# of Neutrons	# of Electrons	Symbol
Hydrogen						
Carbon						
Sodium						
Calcium						
Fe						

3. Define the following and give an example of each using chemical symbols.

- atomic number _____ / _____
- atomic mass _____ / _____
- isotope _____ / _____

4. Which of the following are isotopes of the same element?



5. Describe Rutherford's experiment: _____

6. Explain all the major parts of Dalton's Atomic Theory.

- a.
- b.
- c.
- d.

7. Balance the following chemical equations:



8. Define ionic and Molecular compounds, and tell how each is formed.

9. Name the following compounds and state if it is ionic or molecular in nature:

- a. $\text{Al}(\text{OH})_3$
- b. N_2O_5
- c. MgI_2
- d. Cl_2O_7

Chemistry - Mid Term Exam Review Sheet #1

10. Write a chemical formula for each name given and tell whether it is an ionic (i) or molecular (m) compound:

- a. Ammonium Phosphate _____
- b. Magnesium Nitride _____
- c. Oxygen Difluoride _____
- d. Carbon Dioxide _____
- e. Sulfur Dioxide _____

11. Name and describe the 6 types of chemical reactions. Give an example of each.

- a.
- b.
- c.
- d.
- e.
- f.

12. Define and give an example of each:

Element	_____ / _____
Mixture	_____ / _____
Compound	_____ / _____
homogeneous substance	_____ / _____
heterogeneous substance	_____ / _____
physical property	_____ / _____
chemical property	_____ / _____
physical change	_____ / _____
chemical change	_____ / _____
qualitative measurements	_____ / _____
quantitative measurement	_____ / _____

13. Which of the following is a homogeneous mixture?

- a. oil in water
- b. soot in water
- c. alcohol in water

14. Which of the following could be considered a physical change?

- a. cooking a pancake
- b. burning a tree
- c. melting an ice cube

15. Which of the following is considered a heterogeneous mixture?

- a. salt and sugar
- b. flour and baking powder
- c. salt and pepper

16. Classify each as a physical or chemical change.

- _____ a. instant coffee is combined with hot water to produce a brown liquid
- _____ b. from exposure to air and moisture, iron turns reddish and cannot conduct electricity
- _____ c. iron is heated, turns red and then melts
- _____ d. sugar is heated to produce steam and a black solid

Chemistry - Mid-Term Exam
Study Guide: 2

Name _____

Per. _____

1. Classify each as an element, mixture, ionic compound or molecular compound.

- | | |
|---------------|---------------|
| a. sodium | e. oxygen |
| b. water | f. air |
| c. table salt | g. soil |
| d. sugar | h. lemon soda |

2. Classify each as a qualitative or quantitative observation:

- the liquid solution was blue
- the reaction gave off smoke
- 5 grams of the chemical was used
- the temperature was 87 degrees
- the metal was smooth


3. List the diatomic molecules:

- | | | |
|----------|----------|----------|
| a. _____ | d. _____ | g. _____ |
| b. _____ | e. _____ | |
| c. _____ | f. _____ | |

4. List the names & formulas of the six common acids:

- | | |
|-------------------------|-------------------------|
| a. H_2SO_4 - | d. H_2CO_3 - _____ |
| b. _____ - hydrochloric | e. $HC_2H_3O_2$ - _____ |
| c. _____ - nitric | f. _____ - phosphoric |

5. Define:

- Metal 1 - 3 valence e's, become cations in ionic compounds, lose e's, luster, malleable, conductors
- Non-metal opposites of above... 
- Metalloid _____

6. Classify each element as a metal, non-metal, or metalloid.

- | | |
|-------------|-------------|
| a. aluminum | d. hydrogen |
| b. gold | e. argon |
| c. silicon | |

7. Define groups _____ and periods _____

Describe how elements arranged on the periodic table:

8. What are the main groups of elements on the periodic table and where are they located?

- _____/_____
- _____/_____
- _____/_____

9. What is special about the elements in a particular group on the periodic table?

10. What is the oxidation (nuclear) charge of each substance (ion) given?

- | | | | |
|---------------|----|--------------|----|
| a. Al | 3+ | e. nitrate | 1- |
| b. S | 2- | f. carbonate | 2- |
| c. Cl | 1- | g. lithium | 1- |
| d. phosphorus | 3- | h. Ag | 1- |

Chemistry - Mid-Term Exam

Study Guide: 2

Name _____

Per. _____

11. What is the total positive charge on the Aluminum ion in the following compounds?

- a. $\text{Al}(\text{ClO}_4)_3$ _____ b. $\text{Al}_2(\text{SO}_4)_3$ _____ c. AlPO_4 _____

12. For each compound in question # 25 give the following information:

	$\text{Al}(\text{ClO}_4)_3$	$\text{Al}_2(\text{SO}_4)_3$	AlPO_4
# of moles of atoms for each element			
the total number of atoms in the entire compound			
gram molecular mass of compound			

13. What is Avogadro's number? 6.02×10^{23}

14. Define the following:

- Molecule _____
 Atom _____
 Ion _____
 Cation _____
 Anion _____

15. From what type of elements are cations and anions formed and explain how each is formed.

Cations: metal - loss of electron(s) (-)

Anions: nonmetal - gain electron(s)

16. Calculate the % composition by mass of the compounds formed from these reactions.

a. 8.2 g of Mg combine with 5.4 g of oxygen Mg = 60.3% - O = 39.7%

b. 29 g of Ag combine with 4.3 g of sulfur Ag = 87.1% - S = 12.9%

17. Calculate the % composition by mass of:

Propane C_3H_8 C = 81.2% H = 18.9%

Water H = 11.1% O = 88.9%

18. Element X has two isotopes. The first isotope has a mass of 10.012 amu with a relative abundance of 19.91%. The second has a mass of 11.009 and has a relative abundance of 80.09%. Calculate the atomic mass of this element, and name it.

19. The four isotopes of lead are given below, each with its percent by mass abundance and the composition of its nucleus.

Using this data, calculate the atomic mass of lead.

Pb	Pb	Pb	Pb
p+ = 82	p+ = 82	p+ = 82	p+ = 82
n = 122	n = 124	n = 125	n = 126
1.37%	26.26%	20.82%	51.55%

Mass >



Hint: for #17, and 18 use the formula: % mass (of each element) $\frac{\text{grams of element}}{\text{grams of compound}} \times 100\%$

Chemistry - Mid-Term Exam
Study Guide: 3

Name _____

Per. _____

1. A copper penny has a mass of 3.1 g and a volume of 0.35cm^3 . What is the density of copper?

2. A liquid has a density of 4.8 g/ml. What is the mass of a 2 liter sample?

3. What is the volume of a substance that has a mass of 80 g and a density of 10g/cm^3 ?

4. Indicate the meaning (as a power of 10) for each of the following metric prefix:

a. kilo _____ b. centi _____ c. milli _____

d. deci _____ e. nano _____ f. Micro _____

5. Calculate the following quantities:

a. $1,100\text{ cm} =$ _____ m b. $1\text{ m} =$ _____ mm c. $10\text{ m} =$ _____ cm

d. $2.5\text{ km} =$ _____ m. e. $4.05\text{ kg} =$ _____ g f. $0.5\text{g} =$ _____ mg

g. $1\text{ nm} =$ _____ m h. $3.0\text{ g} =$ _____ ng

6. Indicate the number of significant figures in each of the following:

a. 12600 _____ b. 0.09 _____ c. 2001 _____ d. 0.00500100 _____ e. 1000 _____

7. Define:

accuracy _____

precision _____

8. The accepted value or true value for the density of lead (Pb) is 11.35 g/ml. Your experimental value or observed value found during a class lab is 9.65 g/mL

What is the error of your measurement? _____

What is the percent error of your measurement? _____

9. Define:

Meter _____

Liter _____

Volume _____

Mass _____

Gram _____

Temperature _____

10. Name the two temperature scales used in science? Give the freezing pt., and boiling pt. of water for each of them.

_____/_____
_____/_____

11. Which type of particle (atom, ion, or molecule) goes with each of the following substances?

a. Na _____ b. Ca^{2+} _____ c. N_2 _____

d. Cl_2 _____ e. H_2O _____ f. CO _____

12. Define:

empirical formula _____

molecular formula _____

13. Which of the following are empirical formulas and which are molecular formulas?

a. CH_4N _____ b. NaO _____ c. $\text{C}_6\text{H}_{10}\text{O}_5$ _____

Chemistry - Mid-Term Exam
Study Guide: 3

Name _____

Per. _____

d. H_2O_2 _____

e. Na_2SO_3 _____

f. $C_6H_{10}O_4$ _____

14. Find the empirical formula of each compound from its % composition.

a. 72.4 % Fe and 27.6% O

b. 94.1% O and 5.9% H

15. If given the empirical formula and gram formula mass for a compound, calculate the compound's molecular formula?

a. CH_2O , mass = 90 g/mol

b. $C_3H_5O_2$ mass = 146 g/mol

16. Find the missing density, mass or volume of the following:

a. The mass of a substance is 45.6 g and the volume is 15 cm^3 :

Density = _____

b. The volume of a substance is 2.9 ml its density is 6 g/ml:

Mass = _____

c. The density of a substance is 7.8 g/cm^3 and the mass is 125 g:

Volume = _____

(Hint: $D/V = M/V$ (Given any two of the numbers; D, M or V, you can cross multiply and divide to find what's missing)

17. If you have 6.7 L of O_2 at STP, how many moles do you have _____

18. What is the molar mass of $Sr_3(PO_4)_2$? _____

19. How many moles are in 137.5 g of Mn?

20. What is the mass of 3 moles of Sc?

21. What is the mass of 2 moles of C_2H_6 ?

22. What are the correct formulas for the following compounds?

a. potassium sulfate _____

b. calcium phosphate _____

23. How many moles of $CaCl_2$ are in 12 g of $CaCl_2$?

❖ Finding % composition from Mass of elements in a compound:

What is the percent mass of each element in K_2O if the mass of the compound is 188 g and the mass of oxygen is 32 g? *(Hint: Mass of K must be $188 - 32 = 156$ g)*

$$K = 156/188 = 83\%$$

$$O = 32 / 188 = 17\%$$

❖ Finding % composition from the chemical formula of elements in a compound:

What is the percent mass of the elements in C_3H_8 ? *(Hint: Find molar mass of each element and divide by molar mass of compound).*

$$\text{Molar Mass of } C_3H_8 = 44 \text{ g}$$

$$\text{Mass of 3 moles C} = 36 \text{ g} \quad 36/44 = 82\%$$

$$\text{Mass of 8 moles H} = 8 \text{ g} \quad 8/44 = 18\%$$

❖ Finding empirical formulas by % mass of a compound:

A compound consists of 80% carbon and 20% Hydrogen. What is its empirical formula?

(Hint divide each % by the molar mass of the element)

$$C = 80/12 = 6.7$$

$$H = 20/1 = 20$$

The ratio of 20 to 6.7 is 3 to 1 ($20/6.7 = 2.99$) so there are 3 times as many H as C atoms.

The empirical formula is CH_3