CHE105 Summer 2016 EX1

Name: _____ **ID:** _____

Question #: 1

Diamond is classified as a(n) _____.

A. liquid
B. crystalline solid
C. gas
D. amorphous solid

Question #: 2

A freshly baked chocolate chip cookie is a _____.

A. pure element
B. pure compound
C. homogeneous mixture
D. heterogeneous mixture

Question #: 3

You are running late for class and have 15.4 km to run before you reach the classroom. How many μm do you have to travel?

A. 1.54×10^{10} -μm
B. 1.54×10^{8} -μm
C. 1.54×10^{14} -μm
D. 1.54×10^{4} -μm

Question #: 4

Express 0.0005236 in scientific notation. Use the format 2.222E2 or 2.222E-2 for scientific notation.
1

1. _____

Question #: 5

A cube of copper has a mass of 2.3 mg and a density of 8.96 g/cm^3. What is its **volume**?

A. 2.6×10^{-10} m^3
B. 1.4×10^{-8} m^3
C. 2.6×10^{-7} m^3
D. 2.6×10^{-6} m^3

Question #: 6

What is the result of the following equation?

$$(0.234 - 0.100) \times 4.1 = \_\_1\_\_$$

Report your answer with the **correct** number of significant figures, using the format 2.2E2 or 2.2E-2 for scientific notation.

1. _____

Question #: 7

Kangaroos are reported to jump up to 25 feet in a single leap. This distance equals __1__ centimeters.
Report your answer to the **correct** number of significant figures **without** units. Use the format 2.2E2 or 2.2E-2 for scientific notation.

1. _____

Question #: 8

Susan, an office clerk, burns an average of 1,650 Calories per day. If Susan burns an additional 250 Calories by walking 5,140 more steps per day, how many weeks would it take her to lose 12 lbs? 1 lb = 3,500 Calories

A. 20 weeks
B. 24 weeks
C. 12 weeks
D. 54 weeks

Question #: 9

Choose the **two** statements that **agree** with Dalton's atomic theory.

A. The atoms of one element can be changed into atoms of a different element through chemical reactions.
B. Compounds are formed when atoms of more than one element combine.
C. Each element is composed of extremely small particles called atoms.
D. All atoms of a given element are identical to one another in mass, other properties, and are the same as atoms of another element.

Question #: 10

Which **two** statements do **not** describe Millikan's oil drop experiment?

A. A magnetic field was applied to an electron beam.
B. Oil droplets were suspended in an electric field.
C. It proved that protons are found in the nucleus.
D. The charge of an electron was determined.

Question #: 11

Select the **two** pairs of isotopes. X and Y may be the same or different elements.

A. $^{37}_{17}X$ and $^{35}_{17}Y$

B. $^{101}_{44}X$ and $^{98}_{42}Y$

C. $^{109}_{47}X$ and $^{107}_{47}Y$

D. $^{196}_{78}X$ and $^{198}_{77}Y$

Question #: 12

How many protons, neutrons, and electrons are in the most common ion of calcium-40?
__1__ protons
__2__ neutrons
__3__ electrons

1. _____
2. _____
3. _____

Question #: 13

Classify each description below as a **metal**, **nonmetal**, or **metalloid.**
Found on the **left** side of the periodic table: 1
Form **cations** in compounds: 2
Tend to **gain** electrons in compounds: 3
Make up ~5% of the elements: 4

1. _____
2. _____
3. _____
4. _____

Question #: 14

Silver has an average atomic mass of 107.8682 amu from two naturally occurring isotopes, ^{107}Ag and ^{108}Ag. ^{107}Ag has an atomic mass of 106.9051 amu and ^{108}Ag has an atomic mass of 108.9048 amu. What is the natural abundance of ^{107}Ag?

A. 51.84%
B. 48.16%
C. 82.62%
D. 14.54%

Question #: 15

Element X has 134 protons and 156 neutrons. What are its atomic number and atomic mass?

A. Z = 134, A = 156
B. Z = 156, A = 290
C. Z = 134, A = 290
D. Z =156, A = 134

Question #: 16

There are __1__ **moles** of uranium in 1.42 pg of uranium.
Use the format 2.22E2 or 2.22E-2 for scientific notation. Do **not** include units in your answer.

1. _____

Question #: 17

Calculate the mass of 2.945×10^{21} bromine atoms.

A. 0.3907 g
B. 1.417×10^{47} g
C. 16340 g
D. 2.559 g

Question #: 18

Choose **the two** answers that pair a molecular formula with its empirical formula.

A. C_4H_8 molecular, C_2H_4 empirical
B. N_2H_4 molecular, NH_2 empirical
C. HO molecular, H_2O_2 empirical
D. P_2F_5 molecular, PF_2 empirical

Question #: 19

Which of the following is an **ionic** compound?

A. $C_6H_8O_6$
B. CO
C. K_3PO_4
D. N_2O

Question #: 20

What is the chemical name for SeO_3?

A. selenium oxide
B. selenium trioxygen
C. selenic oxygen
D. selenium trioxide

Question #: 21

There are 1 **atoms** in a 120 g sample of K_2CrO_4 (molar mass 194.2 g/mol).
Report your answer with **two** significant figures, using the form 2.2E2 or 2.2E-2 for scientific notation.

1. _____

Question #: 22

Analysis of a compound shows that it contains 10.4% carbon, 27.8% sulfur, and 61.7% chlorine by mass. What is the **empirical** formula of the compound?

A. C_2SCl
B. CS_2Cl_2
C. $CSCl_2$
D. C_2S_4Cl

Question #: 23

How many **moles** of oxygen are in 9.3 grams of H_2SO_4?

A. 0.38 mol O
B. 0.095 mol O
C. 2.3 mol O
D. 0.58 mol O

Question #: 24

The **molecular** formula for the compound with an empirical formula of NH_2Cl and a molar mass is 103 g/mol is N __1__ H __2__ Cl __3__. Fill in each blank with a **whole number**.

1. _____
2. _____
3. _____

Question #: 25

Balance this chemical equation for the reaction of hydrofluoric acid with sodium silicate with the smallest possible **whole** numbers by filling in each blank with the proper coefficient. If the coefficient is 1, fill in 1.

__1__ $Na_2SiO_3(s)$ + __2__ $HF(aq)$ → __3__ $H_2SiF_6(aq)$ + __4__ $NaF(aq)$ + __5__ $H_2O(l)$

1. _____
2. _____
3. _____
4. _____
5. _____

DRAFT

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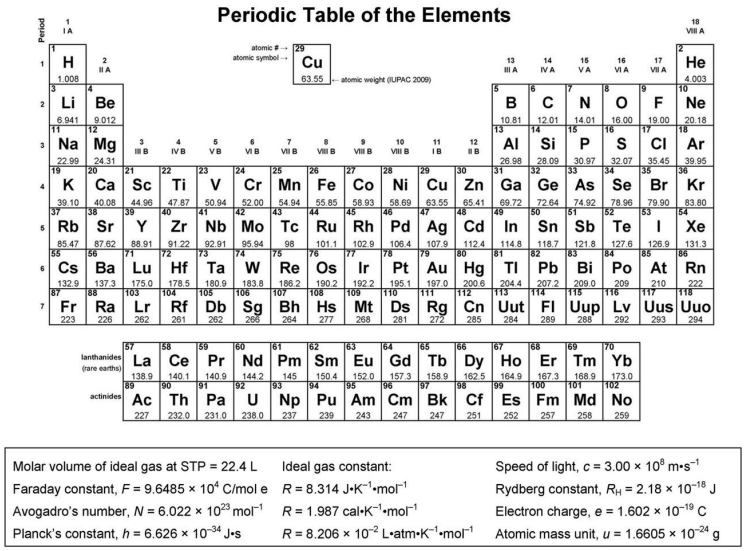
Your Name: _____ **Your ID:** _____



Molar volume of ideal gas at STP = 22.4 L	Ideal gas constant:	Speed of light, $c = 3.00 \times 10^{8}$ m•s^{-1}
Faraday constant, $F = 9.6485 \times 10^{4}$ C/mol e	$R = 8.314$ J•K^{-1}•mol^{-1}	Rydberg constant, $R_H = 2.18 \times 10^{-18}$ J
Avogadro's number, $N = 6.022 \times 10^{23}$ mol^{-1}	$R = 1.987$ cal•K^{-1}•mol^{-1}	Electron charge, $e = 1.602 \times 10^{-19}$ C
Planck's constant, $h = 6.626 \times 10^{-34}$ J•s	$R = 8.206 \times 10^{-2}$ L•atm•K^{-1}•mol^{-1}	Atomic mass unit, $u = 1.6605 \times 10^{-24}$ g

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A. liquid
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C. gas
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A freshly baked chocolate chip cookie is a _____.

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1. 760|7.6E2|

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1 protons
2 neutrons

__3__ electrons

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2. 20
3. 18

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Make up ~5% of the elements: __4__

1. metal|metals|
2. metal|metals|
3. nonmetal|nonmetals|
4. metalloid|metalloids|metaloids|

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1. 3.7E23|3.8E23|3.6E23|

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Analysis of a compound shows that it contains 10.4% carbon, 27.8% sulfur, and 61.7% chlorine by mass. What is the **empirical** formula of the compound?

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The **molecular** formula for the compound with an empirical formula of NH_2Cl and a molar mass is 103 g/mol is N __1__ H __2__ Cl __3__. Fill in each blank with a **whole number**.

1. 2
2. 4
3. 2

Question #: 25

Balance this chemical equation for the reaction of hydrofluoric acid with sodium silicate with the smallest possible **whole** numbers by filling in each blank with the proper coefficient. If the coefficient is 1, fill in 1.

__1__ $Na_2SiO_3(s)$ + __2__ $HF(aq)$ → __3__ $H_2SiF_6(aq)$ + __4__ $NaF(aq)$ + __5__ $H_2O(l)$

1. 1
2. 8
3. 1
4. 2
5. 3