

Name: _____

Exam 2 Review Sheet

Unit 1: Scientific Math

1. Complete the conversions below.

a. 375.4 ng to grams

$$375.4 \text{ ng} \times \frac{1 \text{ g}}{10^9 \text{ ng}} = \boxed{3.754 \times 10^{-7} \text{ g}}$$

b. 92.34 kg to μg

$$\frac{92.34 \text{ kg}}{1} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{10^6 \mu\text{g}}{1 \text{ g}} = \boxed{9.234 \times 10^{10} \mu\text{g}}$$

c. 354 cm to km

$$354 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} \times \frac{1 \text{ km}}{1000 \text{ m}} = \boxed{.00354 \text{ km}}$$

2. What is the mass of a cube that has a density of 2.3 g/mL if the volume of the cube is 15.4 cm^3 ?

$$1 \text{ cm}^3 = 1 \text{ mL} \quad 2.3 \text{ g/mL} = 2.3 \text{ g/cm}^3$$

$$15.4 \text{ cm}^3 \times \frac{2.3 \text{ g}}{1 \text{ cm}^3} = 35.42 = \boxed{35 \text{ g}}$$

3. a. Determine the molarity of a solution if 65.2 g of NaCl is added to enough water to make 456.2 mL of solution.

$$\frac{65.2 \text{ g}}{1} \times \frac{1 \text{ mol}}{58.45 \text{ g}} = 1.115 \text{ mol}$$

$$M = \frac{\text{mol}}{\text{L}} = \frac{1.115 \text{ mol}}{.4562 \text{ L}}$$

$$\frac{456.2 \text{ mL}}{1} \times \frac{1 \text{ L}}{1000 \text{ mL}} = .4562 \text{ L}$$

$$= \boxed{2.44 \text{ M}}$$

b. How many moles of NaCl could be obtained from 55 mL of the above solution?

$$55 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{2.44 \text{ mol}}{1 \text{ L}} = \boxed{.13 \text{ mol of NaCl}}$$

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Unit 2: Atomic Theory and Structure

1. Be able to discuss the scientists and their discoveries. Example: Explain Rutherford's contribution to the atomic theory.

Rutherford discovered that atoms have a dense nucleus and atoms are made of mostly empty space. He found this using gold foil experiment.

Symbol	Name	Atomic number	Mass number	# particles in nucleus	# protons	# neutrons	# electrons
${}^{36}_{17}\text{Cl}$	Chlorine-36	17	36	36	17	19	17
${}^{88}_{38}\text{Sr}$	Strontium-88	38	88	88	38	50	36

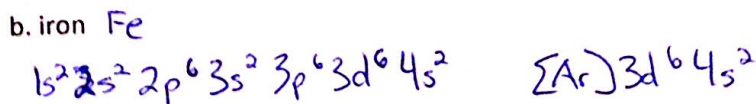
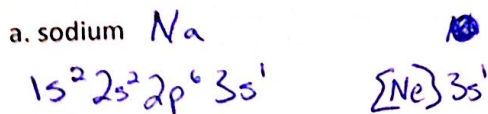
3. Calculate the average atomic mass of bromine. One isotope of bromine has an atomic mass of 78.92amu and a relative abundance of 50.69%. The other major isotope of bromine has an atomic mass of 80.92amu and a relative abundance of 49.31%.

$$78.92 \cdot .5069 = 40.00 \text{ amu}$$

$$80.92 \cdot .4931 = 39.90 \text{ amu}$$

$$40.00 + 39.90 = 79.90 \text{ amu}$$

4. Give the electron configuration of the following (long form and short form):



5. A red neon light has a wavelength of 656 nm. Calculate the frequency and the energy of the light.

$$656 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}} = 656 \times 10^{-7} \text{ m}$$

$$c = \lambda \nu \quad 3.00 \times 10^8 \frac{\text{m}}{\text{s}} = 6.56 \times 10^{-7} \text{ m} \cdot \nu \quad \nu = 4.57 \times 10^{14} \text{ s}^{-1}$$

$$E = h \cdot \nu = 6.626 \times 10^{-34} \text{ J} \cdot \text{s} \cdot 4.57 \times 10^{14} \text{ s}^{-1} = 3.03 \times 10^{-19} \text{ J}$$

Unit 3 Periodic Table

Groups of the periodic table and their properties

Properties of metals, nonmetals and metalloids

Periodic Trends (MEMORIZE)

Be able to explain why each of the trends is the way it is

Be able to compare two or more elements using the trends

Unit 4 Ionic and Metallic Compounds

Lewis Dot Structures to show transfer of electrons

Properties of Ionic and Metallic Compounds

Ionic Naming

1. Mg_3N_2

magnesium nitride

2. KI

potassium iodide

3. $Cr(PO_3)_2$

chromium (VI) phosphite

6. Cesium sulfate

Cs_2SO_4

7. Calcium hydroxide

$Ca(OH)_2$

4. $CuSO_4$

copper (II) sulfate

5. $FeCl_2$

iron (II) chloride

8. Tin (IV) bromide

$SnBr_4$

9. Iron (II) nitrate

$Fe(NO_3)_2$