

Chemistry Worksheet 2

Hydrated Compounds - Molar Volume – Mass % Composition

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Name _____ Date _____ Period _____

Hydrated Compounds:

1. A hydrated compound of cupric chloride has the formula $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$. What is the formula mass for this compound?

Answer: _____ g/mol

2. Iron(III)nitrate is a hydrated compound with a total formula mass of 404.0g/mol. How many water molecules are associated with each unit of iron(III)nitrate?

Answer: _____ water molecules

3. A hydrated compound of zinc chloride is 44.23% water by mass. What is the empirical formula for this compound?

Answer: _____

Standard Molar Volume, Molar Mass and Density:

1. What is the volume of 0.500mol of O_2 gas at STP?

Answer: _____ L

2. How many liters would 1.000g of helium gas occupy at STP?

Answer: _____ L

3. If sodium metal and chlorine gas are known to combine in a 2:1 ratio by number of moles, how many liters of chlorine gas are needed to react with 3.500g of sodium metal if the reaction takes place at STP?

Answer: _____ L Cl_2

4. How many molecules of Cl_2 would be contained in the volume you determined in question 3 above?

Answer: _____ molecules Cl_2

5. What is the density of helium at STP? How does this compare to the density of oxygen (O_2)?

Answer: Density He = _____ g/L **Density of O_2 =** _____ g/L

6. A monoatomic elemental gas has a density of 1.78g/L at STP. What is the identity of the gas?

Answer: _____

Mass Percent Composition:

1. What is the mass percentage of each of the elements contained in the citric acid molecule with a formula of $\text{C}_6\text{H}_8\text{O}_7$?

Answer: C = _____ % **H =** _____ % **O =** _____ %

2. The compound ethylene glycol (a common anti-freeze agent) is 38.70% carbon, 9.74% hydrogen by mass and the rest is oxygen. What is the empirical formula for this compound?

Answer: _____

3. If the actual molar mass of ethylene glycol is between 50.00 and 70.00 grams per mole. What is the molecular formula for this compound?

Answer: _____

4. How many molecules of ethylene glycol are in 100.00g of that substance?

Answer: _____ molecules

5. What is the mass percent of carbon in glucose, $\text{C}_6\text{H}_{12}\text{O}_6$?

Answer: _____ % C