

Name: _____

Today we will re-examine several parts of chemistry. Do numbers 1-18, no blanks.

We will be using $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. For this compound,

1. Determine the molar mass of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, and then Calculate the percent composition by mass of copper, sulfur, oxygen and water. (do water separately, do not include the O of water in with the oxygen of the sulfate).



Secure exactly 3.00 grams of copper II sulfate pentahydrate. Place into a clean, dry evaporating dish. Mass the dish empty, and with compound. Heat it repeatedly and re-mass it until the mass stops changing. Drip a bit of water back into the white solid, watch what happens.

3. Measure the % Composition by mass that was water in this compound. _____% (show work)

4. Determine your % Error for percent composition of water in this. _____% (formula and work)

5. Explain what happens when you drip some water into the anhydrous salt of copper II sulfate.

Name these compounds (show math on white paper)	molar mass of compound	% composition by mass of water in this compound
6. $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$		
7. $\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$		
8. $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$		
9. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$		

10. How many grams of NaCl completely saturates a 600.0 mL solution of $\text{NaCl}_{(\text{AQ})}$ at 25.0°C ?

11. This is a hard question: If you add enough sodium chloride to saturate a 600.0 mL solution that started out at 25.0°C , what would be the temperature of the solution immediately after you mix this together?
 HINTS: start by looking over at Table G, then Table I.

12. Put these statements in a NUMERIC order (oldest first): _____

- A. Rutherford shoots alpha particles at gold, discovers the positive nucleus and he puts the negative electrons in orbits.
- B. We understand that the electrons exist in energy levels or orbitals. The Heisenberg Uncertainty Principle shows us that we can know where an electron is, or how fast it is moving, but not both at the same time. Chemistry is much harder, but it makes more sense if you do your homework.
- C. Democritus thinks about some things and invents the concept of the atom
- D. Thomson uses the cathode ray tube to discover the electron as a separate “particle of the atom. Since he likes his wife’s plum pudding, he imagines the atoms as food, putting his electrons into the positive “mush” or “pudding” of the atom.
- E. Dalton finds himself bored with farming so he invents modern chemistry in his barn. His Atomic Theory stands today with some exceptions. His “model” of the atom was similar to a very tiny, hard sphere or ball. These little balls had different masses, but otherwise were the same as each other.
- F. Neils Bohr does the math to save his boss’s idea of the atom. He puts the electrons into distinct orbits, where they can fly around with out losing energy and when they jump to higher energy levels they are excited, when they return to the ground state, they release spectra.

You measure the following masses for these substances. Do the math asked of you for each species. (significant figures are significant). Species is a biology word to be sure, but the Regents uses it in chemistry sometimes to make you crazy. It means “particular substance” in this case. There are several species of carbon, C-12, C-14, and even some C-13 (those are isotopes). In a different use of the word species, there are two species of aluminum, Al⁰ and Al⁺³, which are the neutral atom and the positive three cation.

	species	mass	show work on white paper
14	NaCl	214.0 grams	Number of MOLES present
15	Cu	624.9 grams	Number of ATOMS present
16	N ₂	454 grams	Number of LITERS present
17	MgSO ₄	135.5 grams	Number of FORMULA UNITS present
18	Al ₂ O ₃	501 grams	Number of MOLES present