

This lab will be for review purposes. We will re-examine several parts of chemistry. This lab will be special in that there is NO CONCLUSION, which means all of your energies will be focused on getting the numbers correct. Do numbers 1-18, no blanks.

Part 1 Stoichiometry and % Composition by Mass

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

- Determine its: MOLAR MASS _____ g/mol
- % composition by mass that is water _____%

Secure exactly 3.00 grams of copper II sulfate pentahydrate. Place into a clean, cool, dry crucible. Mass crucible empty, and with compound. Heat it repeatedly and re-mass it until the mass stops changing.

- Measure the % Composition by mass that was water in this compound. _____%
- Determine your % Error for % composition of water in this compound. _____%
- Explain why the anhydrous salt of copper II sulfate (white) turns blue when you drip a few drops of water back into it.

Name these compounds	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. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$		

PART 2

Imagine you have exactly 600.0 mL deionized water at 293 Kelvin.

- How many grams of sodium chloride would it take to completely saturate this water?
- What would the temperature of the water be after you mixed all of this salt into the water? HINTS: Table G, then Table I.

PART 3

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

1. Rutherford shoots alpha particles at gold, discovers the positive nucleus and he puts the negative electrons in orbits.
2. 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 and are very smart.
3. Democritus thinks about some things and invents the concept of the atom
4. 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.
5. 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.
6. 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.

PART 4

You measure the following masses for these substances. Decide how much of a mole you have (significant figures are significant)

	compound	mass	Number of moles present
14	NaCl	214 grams	
15	Cu	624 grams	
16	Hg	454 grams	
17	MgSO ₄	135.5 grams	
18	Al ₂ O ₃	501 grams	