

Molarity = _____

1 Liter = _____ mL = _____ cm³

1. Fill in the formula and blanks, above.

2. a. What is the formula for sodium sulfate? _____

b. What mass of sodium sulfate is required, in order to make 350 mL of 2.0 Molar sodium sulfate?

3. a. What is the formula for ferric sulfate? _____

b. If you have 1500 mL of 0.20 M ferric sulfate solution, and you boil off all of the water, what mass of ferric sulfate would be left behind?

4. a. What is the formula for chromium III nitrate? _____

b. If 88.9 grams of chromium III nitrate are mixed with 323 mL of water, the entire solution volume comes to 356 mL once the solid dissolved. Calculate the molarity of chromium nitrate in this solution.

5. Soap can be made by reacting a fat or oil (for example, coconut oil, beef tallow, lard, olive oil...) with a concentrated solution of sodium hydroxide (aka "lye").

Suppose that you need to make 300. mL of 5.0 Molar NaOH in order to make a batch of soap.

What mass of NaOH would you need to weigh out?

6. What is the formula for potassium chloride? _____
 b. Calculate the molarity of potassium chloride in a solution that contains 3.58 moles of potassium chloride per 750. mL solution.

7. In the sugar demo (the first week of the class), about 50. mL of 18. Molar sulfuric acid (H_2SO_4) was added to the sugar, to catalyze the sugar's decomposition into carbon and water vapor. How many moles of H_2SO_4 were present in the 50. mL?

- 8.a. What is the formula for aluminum bromide? _____
 b. What mass of aluminum bromide is contained in 20.0 mL of 0.667 M aluminum bromide solution?

9. a. How many protons, neutrons, and electrons are in this atom? ^{50}Ti p _____ n _____ e _____
 b. How many protons, neutrons, and electrons are in this ion? $^{52}\text{V}^{+3}$ p _____ n _____ e _____
 c. How many protons, neutrons, and electrons are in $^{15}\text{N}^{-3}$ p _____ n _____ e _____
 d. Is $^{15}\text{N}^{-3}$ an atom or ion? *atom* *ion* How can you tell? _____
 e. How many p, n, and e are in the most common isotope of Phosphorus (P)? p _____ n _____ e _____

10. What is the charge on a sodium (Na) atom? _____
 What is the charge on a sodium ion? _____
 When a sodium atom forms an ion, does it gain or lose electrons? _____
 How many electrons must it gain/ lose? _____
 Which noble gas has the same number of electrons as a sodium ion? _____

11. What is the charge on a phosphorus (P) atom? _____
 What is the charge on a phosphide ion? _____
 When a phosphorus atom forms an ion, does it gain or lose electrons? _____
 How many electrons must it gain/ lose? _____
 Which noble gas has the same number of electrons as a phosphide ion? _____

12. For each atom shown below, determine the charge of ion that the atom will form, and write that charge the atom symbol. (You should be able to do this without looking at your blue ion sheet).

K Cl S Se Mg Rb Ra Cs Te At O Y Be

13. The protons and neutrons are in the atom's nucleus, and the electrons are in orbitals, outside of the nucleus.
 a. Are the electrons attracted to or repelled by the nucleus (which one)? _____

Why? _____

b. Are the electrons attracted to or repelled by the other electrons in the atom? _____

Why? _____