CHM1020 Study Guide for Exam 3 (Chapters 7, 8, & 9)
Revised November 16, 2015

This may NOT be a complete list of what will be on the Test. You must also study class notes, the homework, and the textbook. You will still need to know the information from Test 1 & Test 2. This is just a study guide to help you.

1. Find the molar mass of an atom or a compound.
2. Use a molar mass to convert between grams and moles.
3. Use Avogadro's number to convert between moles and number of items (for example number of atoms, molecules or ions) i.e. 1 mole Zn = 6.022×10^{23} Zn atoms
4. Convert between number of atoms in a molecule, or number of moles of atoms in a mole of a compound. i.e. 1 molecule $C_6H_{12}O_6$ = 6 C atoms, or 1 mole $C_6H_{12}O_6$ = 6 mole C
5. Be able to combine 2 or more of the conversions above (in multiple steps in a calculation).
6. Calculate percent by mass.
7. Find an empirical formula.
8. Find a molecular formula.
9. Define precipitate.
10. Know solubility guidelines listed below, and be able to use the table for the other solubility rules. (The second table listed is what you will be given to use on the test.)
11. Be able to identify ionic compounds that are soluble or insoluble based on solubility guidelines.
12. Be able to write the products of a precipitation reaction.
13. Define or identify electrolytes, strong electrolytes, strong acids, or strong bases.
14. Be able to write a balanced, complete ionic equation, a net ionic equation and identify spectator ions.
15. Be able to write the products of an acid-base reaction.
16. Define oxidation and reduction.
17. Be able to identify an oxidation-reduction reaction and identify which element was oxidized and which element was reduced.
18. Be able to identify reactions: combination, decomposition, precipitation, acid-base, oxidation-reduction, or combustion reactions
19. Be able to write the products of a combustion reaction.
20. Find the molar mass of an atom or a compound.
21. Use a molar mass to convert between grams and moles.
22. Use a mole-to-mole ratio.
23. Calculations using mole-to-mole ratios and molar masses (2 or 3 steps).
24. Find the Limiting Reactant when given amounts of 2 reactants.
25. Find the amount of product made using the Limiting Reactant.
26. Calculate percent yield and theoretical yield.
27. Percent yield = (actual yield/theoretical yield)x100

Definitions or examples: molar mass, mole-to-mole ratio, percent composition by mass, empirical formula, molecular formula, precipitate, solubility, precipitation reaction, acid-base reaction, oxidation, reduction, oxidation-reduction reaction (Redox rxn), combustion reaction, electrolytes, strong electrolytes, strong acids, or strong bases, complete ionic equation, a net ionic equation, spectator ions, limiting reactant, percent yield, actual yield, theoretical yield, mole-to-mole ratio.

Solubility Guidelines

You must know: Always soluble: NO_3^{-1}, NH_4^{+1}, alkali metal ions (Li^{+1}, Na^{+1}, K^{+1}, …)

Usually soluble:	except if paired with:
Cl^{-1}, Br^{-1}, I^{-1}	Ag^{+1}, Pb^{+2}, Hg_2^{+2}
SO_4^{-2}	Ba^{+2}, Pb^{+2}, Ca^{+2}

Usually insoluble:	except if paired with:
S^{-2}, CO_3^{-2}, PO_4^{-3}	NH_4^{+1}, alkali metal ions
OH^{-1}	NH_4^{+1}, alkali metal ions, Ca^{+2}, Ba^{+2}

Given on Test 3: **Solubility Guidelines**

Usually soluble:	exceptions:
Cl^{-1}, Br^{-1}, I^{-1}	Ag^{+1}, Pb^{+2}, Hg_2^{+2}
SO_4^{-2}	Ba^{+2}, Pb^{+2}, Ca^{+2}

Usually insoluble:	exceptions:
S^{-2}, CO_3^{-2}, PO_4^{-3}	NH_4^{+1}, alkali metal ions
OH^{-1}	NH_4^{+1}, alkali metal ions, Ca^{+2}, Ba^{+2}