CHM 161 Exam II Study Guide

Worked Examples = *w.e.*

CH 3 – Ionic Compounds
Ionic Bonds
- Octet Rule; predicting formulas of binary ionic compounds – *worked examples* 3.3-3.5; *problems* 3.12, 44-49
- Using periodic table (group #) to predict ion formation
- Naming ionic compounds – e.g. what is the formula for magnesium oxide, sodium sulfide, calcium nitride?
- Polyatomic ions, e.g. names (sulfate), formulas (SO_4) and charges (-2). Know Table 3.3, p. 85, with exception of chromate, dichromate, permanganate, oxalate.
- Roman numerals system for naming cations from transition metals. For example: What is the formula of iron(III) sulfate; what is the name of Cu_3PO_4? *Problems* 3.17-22, 3.64-73, 75, 93, 94.
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CH 4 – Molecular Compounds
Covalent bonding- definition
- Octet rule
- bonding tendencies of different atoms (use periodic table, Figure 4.3)
- similarities between elements in the same group
- Be able to draw Lewis structures from molecular formulas or from partially drawn structures – worked examples 4.4,4.5; problems 4.5,4.6, 108
- Lewis structures – given a formula, draw a structure of a molecule, *w.e.* 4.6-4.7; *problems* 4.8-4.10, 48-52, 58, 59, 61, 62, 104, 106.
- Predicting number of shared electrons based on molecular formula [(# e⁻ valence desired by the atoms) - (# valence e⁻ they have)]
- Geometries of compounds (and bond angles) based on the structure: *w.e.* 4.9-4.10, 4.14, 4.68, 69, 70(not c)
- Electronegativity and polar covalent bonds (sections 4.9, 4.10): *w.e.* 4.12, problems 4.21, 22, 77, 78, 82.
- Naming binary molecular compounds (section 4.11): *w.e.* 4.13, 4.14; problems 4.24, 25, 85-88, 102.

CH 5 – Classification and Balancing of Chemical Reactions
Sections 1-5:
- Chemical equations – reading them (*s*), (*l*), (*g*), (*aq*). *w.e.* 5.1, problem 5.1
- Balancing chemical equations (crucial); *w.e.* 5.3, 5.4, *problems* 5.3, 5.4, 5.28, 5.29,5.32-34.
- Identifying types of chemical reactions: precipitation, acid-base neutralization, oxidation-reduction ("redox"). *w.e.* 5.5, problems 5.6,
- Precipitation: problems 5.8, 5.9, 5.45, 5.46, 5.49.

- Acid-base reactions: *w.e.* 5.7, problem 5.11a, 38b,d. Be able to predict the products if they are not given (the salt and water).
- Be able to draw the formulas, predict the products and balance an equation that is written in words, e.g.
    a) acid-base: Sulfuric acid reacts with calcium hydroxide
    b) precipitation: Sodium phosphate reacts with silver (I) nitrate