Problem Set 1

1. Review Chapter 1. You should be familiar with that material from General Chemistry: atomic structure, the Octet Rule, Lewis structures, molecular shape based on Lewis structures and VSEPR theory, principles of covalent bonding, multiple bonds, electronegativity, formal charges, ionic structures, resonance, structural and molecular formulas, molecular orbitals, and hybridization of orbitals (i.e., sp^3, sp^2, and sp orbitals) and the resulting effect of hybridization on molecular shape. I recommend that you go over this material to refresh your memory, particularly with regard to hybridization and molecular geometry.

2. Review Chapter 2 Sections 1-13. You should be familiar with that material from General Chemistry: bond and molecular polarity, intermolecular forces, and principles of acids and bases (Arrhenius, Bronsted-Lowry and Lewis acids and bases).

3. Read Chapter 2 Sections 15-17. Those sections introduce and discuss hydrocarbons and organic functional groups. You should be familiar with the different organic functional groups.

4. Read Chapter 3 Section 1. You are responsible for knowing the four different classes of saturated and unsaturated of hydrocarbons. Chapter 3 focuses on the structures, energetics and properties of saturated hydrocarbons: alkanes and cycloalkances.

5. Read Chapter 3 Section 2. Study Table 3-2. You are responsible for knowing the molecular formulas and structures of straight-chain (normal) alkanes containing 1-12 carbons. The names of straight-chain hydrocarbons are used as the root name or parent name for all saturated organic compounds.

Work the following problem found in Chapter 3 Section 2 of the text: **Problem 1**.

6. Read Chapter 3 Section 3. You are responsible for knowing the common names of simple straight-chain and branched alkanes, the names of alkyl groups (alkane substituents) with 1-4 carbons, degrees of substitution on carbon (1°, 2°, 3° and 4°), and the IUPAC rules for naming substituted alkanes. Those rules serve as the basis for naming all organic compounds. See Appendix 5 in the Wade text for the full set of rules for naming organic compounds using IUPAC nomenclature.

Work the following problems found in Chapter 3 Section 3 of the text: **Problems 2-9**.

Work the following problems found at the back of Chapter 3: **Problems 33, 34a (also name the structures), 36a,b,c,d,e, 37a,b, 38, 39a,b,c, 41, 43.**

Note: The Wade text contains both "Solved Problems" with the solutions provided and "Problems" with no solution provided. " Problems 1-9 above are "Problems". I recommend that you study the "Solved Problems" as well to get additional practice.

Solutions to Problems: The solutions to problems are located in the Solutions Manual for Wade. I've scanned and posted the solutions for your convenience. I may also provide my own hand-written solutions to problems in the future to supplement the answers in the Solutions Manual. The Solutions Manual for Wade is available in the bookstore and from sources such as Amazon on the internet.