Chem 201, 2009
HW #2, due Th, Sept 17, 12 PM

Draw your answers on a separate sheet of paper. Write clearly.

#1. Loudon problems from chapter 2: 27A, 29ae, 30C*, 37**, 40

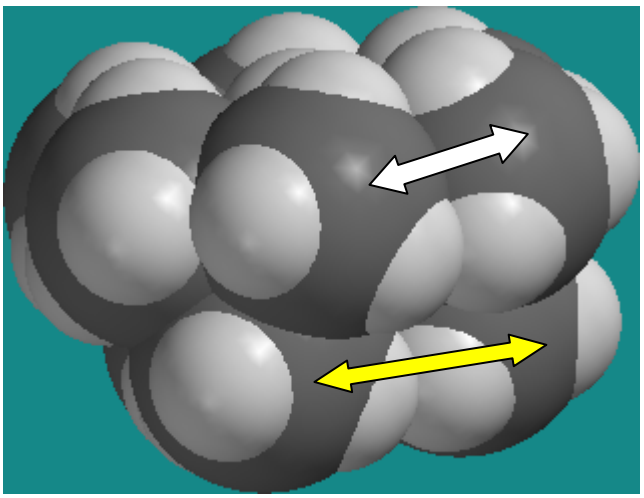
* 30C. Draw a skeletal formula
** 37a. Use the Cl-C-C-Cl dihedral angle as the horizontal axis of your graph.
** 37b. Draw a Newman projection of the conformation that is present in greatest amount.

#2. Re-draw the molecule shown in Loudon 2.27a and identify all of the methylene groups.

#3. This question makes use of the Newman diagrams in Loudon 2.33a.
a. Examine structures A, B, C and draw skeletal formulas of the two unique compounds (two structures correspond to the same compound).
b. Identify the bonds on your skeletal formulas that are used as bond axes in structures A, B, C
c. Starting with structure B, imagine internal rotations about the selected bond and draw Newman projections for the two remaining staggered conformers. Rank the three conformers (B + 2 other conformers) from low energy (most stable) to high energy (least stable). Explain your ranking.

#4. Compound A (Loudon 2.39) contains three unusually long $CC_{central}$ bonds and three unusually large $CC_{central}C$ bond angles ($C_{central}$ refers to the central C). A space-filling model of compound A shows that the atoms are tightly packed with many carbons in close-contact (see below). When I measure the distances between "touching" carbons in adjacent *tert*-butyl groups, I find relatively long distances of 2.9 Å (white arrow) and 3.4 Å (yellow arrow). Likewise, when I measure the distances between the methyl carbons in eclipsed butane (CCCC dihedral angle = 0^o), I find the C_1-C_4 distance is about 2.9 Å. Based on these data, recommend a lower limit for the van der Waals radius of carbon.

#5. A structural formula of fluoxetine, the active component in Prozac, can be obtained from Wikipedia (just type in 'fluoxetine').



a. Name the functional groups that contain N and O.

b. Redraw fluoxetine using R, Ph, Ar symbols wherever possible (do not use these symbols for the three-carbon chain connecting N and O).