

Chem 370 - Spring, 2019 Assignment 5

Reading Assignment

As indicated in the previous assignment, read Chapter 5, if you have not already done so. I may gloss over certain topics in this chapter and give greater emphasis to others. (For example, I will not take up the use of projection operators for generating MO wave functions in section 5.4.5, because I feel that this technique is a more advanced application of group theory that is unnecessary at this level.) Looking ahead to Chapter 6, the authors have significantly rearranged and added to this material in the 5th edition. We will cover most of the material in sections 6.1 through 6.5 (sections 6.1, 6.2, and 6.4 in the 4th edition). We will skip section 6.6 (6.3 in the 4th edition) on Hard and Soft Acids and Bases.

Homework Assignment

Because of the lost lecture and discussion due to snow, we will shift the weekly discussions to Fridays until test 2. This means that we will have two lectures on Mondays, one during our regular time and one one in the afternoon. Accordingly, we will review this assignment on Friday, March 22nd during our regular class meeting time (10:00 a.m.). Do the following problems at the end of Chapter 5 of the text (4th edition equivalents in parentheses): 5.1 through 5.8 (same), 5.10 (5.9), 5.14 (5.13), 5.17 (5.16), 5.18 (5.17), 5.21 (5.20).

Note that the text uses the phrase “group orbitals” in reference to what most chemists call “symmetry adapted linear combinations of atomic orbitals” (SALCs). That is the way I refer to these combinations of orbitals on pendant atoms.

For 5.21, take a set of three inward-pointing vectors (see below) as the basis for a representation. In this case the SALCs will be the complete MOs, because there is no central atom with AOs with which to match SALCs.

