CHEM 1223-02 _____(Print name & pledge)
Homework, Chapter 10 (2nd half)
Due: Wed, 1/21 at 10 AM

Instructions: Answer the following questions showing all necessary explanations and/or work with units, formulas, and calculations.

1. Discuss the differences between valence bond theory and molecular orbital theory.

2. Bond order tells us how many bonds exist between two atoms. (For example, a bond order of 1 means there is a single bond, 2 means a double bond, etc.) If bond order increases, what does this tell us about bond strength, bond length, and bond energy?

3. Calcium carbide, CaC_2, contains the acetylide ion, C_2^{2-}. Sketch the ***full*** molecular orbital energy level diagram for the ion and give the ***full*** molecular orbital configuration. (Answer this question on a separate sheet of paper.)

4. How many pi bonds does the molecule have? What is the bond order?

5. (a) Place the following molecules in order of most stable to least stable and explain why.
H_2^+, H_2, H_2^-, He_2 (b) Technically, none of these species have exactly equal stability. Reorder them and explain why they don't have equal stability.