

CH301 Worksheet 8—Molecular Orbital Theory

For each of the following statements, identify if it is true or false. If it is false, correct it to make it true.

1. The concept of σ and π bonds is developed for both VSEPR and MO theory.
2. There are three homonuclear diatoms from the $n=2$ row that have a bond order of 0.
3. When constructing the MO energy levels, the number of molecular orbitals is always equal to the number of atomic orbitals and is twice the number of antibonding orbitals.
4. Hund, Pauli and Aufbau rules that were developed for electronic configurations of atoms also apply to electronic configurations in MO theory.
5. The bond order in MO theory is another way of calculating the number of bonds between two atoms in a Lewis structure.
6. Both atomic oxygen and diatomic oxygen are paramagnetic.
7. The maximum bond order for a diatomic species is 3 and corresponds to compounds with the largest bond lengths and lowest bond energies.
8. The sequence of diatoms and diatomic ions: O_2^+ , O_2 , O_2^- , decreases in bond order.
9. The sequence of diatoms and diatomic ions, : N_2^+ , N_2 , N_2^- , decreases in bond length.
10. In order to argue for paramagnetism in O_2 , you must fill in the correct electronic MO configuration (symmetrical rather than sad face.)

