

HW Set #6

Due 10/26/10 (at the beginning of class)

Work the following problems in chapter 6

8, 10, 12, 16, 18, 26, 30, 34 (use the MO diagram in figure 6.28)

Explain why each of the following statements is false.

The Born Openheimer approximation assumes that the electronic wavefunction is independent of nuclear coordinates.

Solutions to H_2^+ presented in the text are the exact wavefunctions for the H_2^+ molecule.

All molecular orbitals with even symmetry are bonding.

Short Answer

If you excited the electron in H_2^+ from the $1\sigma_g$ state to the $1\sigma_u^*$ what would expect to happen to the molecule?

Which of the following has the highest bond order O_2 , O_2^+ , N_2 , N_2^+ ?

Something to think about.

In the orbital approximation, light can be used to excited electrons between orbitals of opposite symmetry (g to u, or u to g). Given this information see if you can figure out the lower limit for the energy difference between the π and π^* orbitals in N_2 ? Give your answer in J and explain your reasoning.