1. **(10 points)** You might need to read Silbey Alberty and Bawendi, Section 11.5 to do this problem.
   
   A. Draw a molecular orbital energy level diagram for the valence electrons of $\text{N}_2$. Then, considering the following molecules: $\text{N}_2^+$, $\text{N}_2$, $\text{N}_2^-$, $\text{N}_2^{2-}$; 

   B. Write out the ground state electronic configuration for each molecule 

   C. List these species in terms of increasing bond energy 

   D. List them in terms of increasing bond length 

2. **(8 points)** Label each of these molecular orbitals with their angular momentum, bonding or anti-bonding, and g/u parity designations. The colors correspond to +/- amplitude regions of each wavefunction. *You may need to look at the online version of these figures to clearly see the shading of these orbitals.*

   ![Diagram](A)

   ![Diagram](B)

   ![Diagram](C)

   ![Diagram](D)