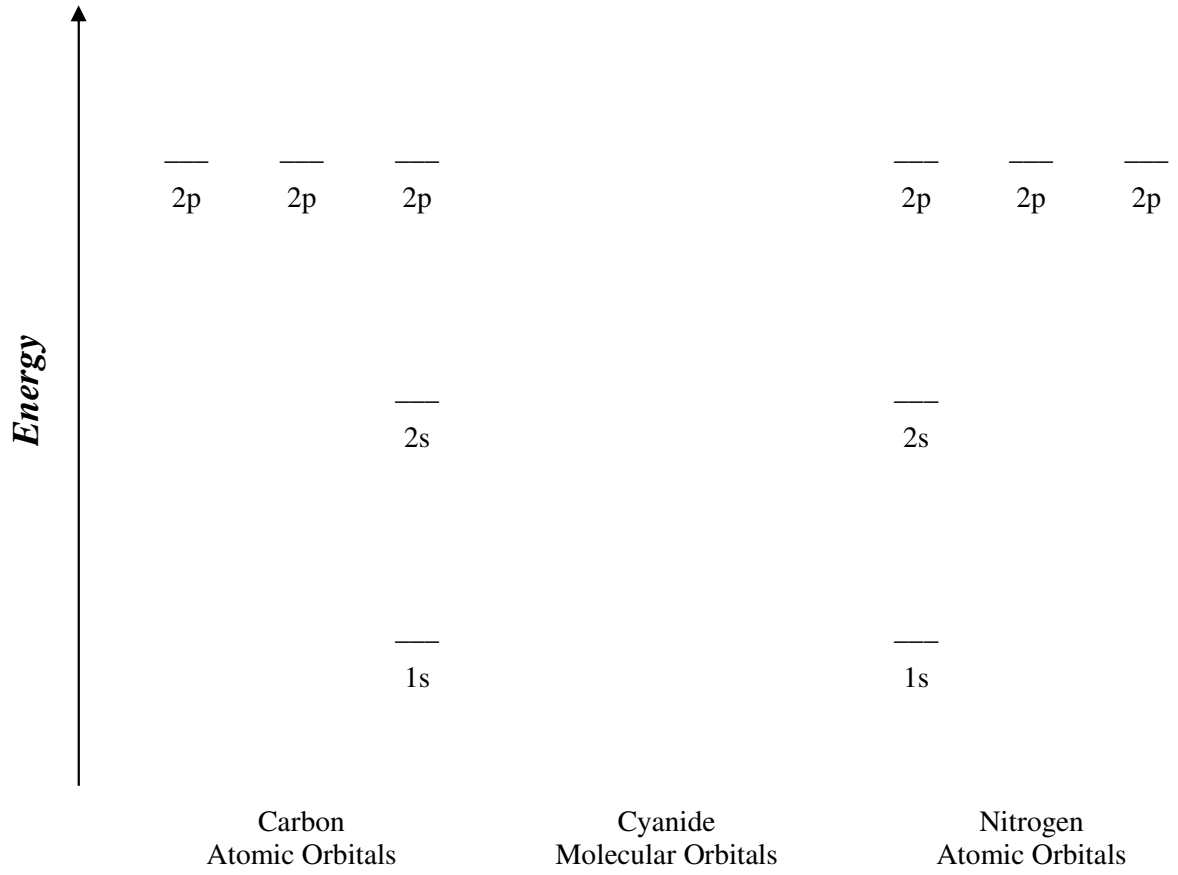
CHEM 131 **Name** _____

Quiz 5 – October 2, 2019

Complete the following problems. Write your final answers in the blanks provided. You must show your work to receive full credit. Show your answers to the correct number of significant figures with the correct units.

1. Answer the following questions about cyanide ion (CN^-).
   a. Complete the MO diagram below for cyanide. You may assume that the distribution of molecular orbitals is similar to that in N_2. (6 points)



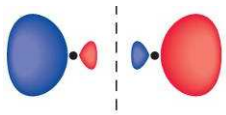
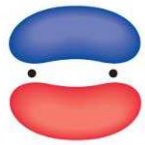
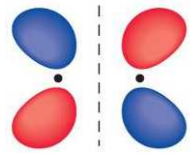
   b. What is the bond order for CN^-? (2 points)

   c. Is CN^- paramagnetic? Why or why not? (3 points)

   d. Would you expect the CN^+ ion to be more or less stable than CN^-? Why? (3 points)

2. Use molecular orbital theory to demonstrate that Be_2 is likely to be an unstable species. Use an MO diagram and bond order calculation to justify your answer. (8 points)

3. Label the molecular orbitals below as either σ_{2p}, σ_{2p}^*, π_{2p} or π_{2p}^*. (4 points)

Orbital				
Label