CHEM 281. Winter 2002. Homework 1. Chapter 1

Chapter 1.

1. Define the following terms, (a) nodal surface b) Pauli exclusion princile (c) paramagnetism
2. Define the following terms: (a) orbitals (b) degeneracy (c) Hund's rule.
3. Construct a quantum number tree for the principal quantum number n = 4 similar to that depicted for $n = 3$ in Figure 1,5.
4. Detemine the lowest value of n for which m_l can have a value of +4
5. Identify the orbital that has $n = 6$ and $l = 0$,
6. Explain concisely why carbon has two electrons in different p orbitals with parallel spins rather than the other possible arrangements.
7. Write noble gas core ground state electron configaration for atoms of (a) sodiuim; (b) nickel; (c) copper.
8. Write noble gas gas core ground state electron configaration for atoms of (a) potassium; (b) scandium 3+;(c) copper 2+.
9. Predict the common charge of the silver ion. Explain your reasoning in terms of electron configratioris.
10. Use diagrams similar to Figure 1.14 to determine the number of unpaired electrorns in atoms of (a) oxygen; (b) magnesium; (c) chromium.
11. Write the electron configuration expected for element 113 and the configurations for the two cations that it is most likely to from.
12. In the text set of orbitals after the f orbitals are g orbitals. How many g orbitals would there be? What would be the lowest principle quantum number n that would pocess g orbitals? Deduce the atomic number of the first element at which g orbitals would begin to be filled on the basis of the patterns of the d and f orbitals.