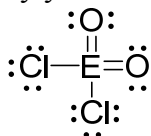


Accelerated General Chemistry
Problem Set 4
Due Friday, September 26, 2008 (at 4:00 p.m.)
(note change in date from syllabus)
Total Points on This Assignment = 65

Note my standard policy on Lewis structures: (1) Every valid Lewis structure must have all non-zero formal charges labeled, even if your textbook does not ask for this. (2) Don't bother labeling any formal charges that are zero, even if your textbook does ask for this. (3) If it helps you to write down how you calculate the number of valence electrons or formal charges for a species, you are free to do so. But, unless I tell you otherwise, you are not required to do so for full credit. (4) If it is possible to eliminate formal charge by invoking valence expansion (for atoms in the 3rd period and below), you should always do it! (You won't have to think about Rule 4 a lot until the next problem set.)

1. (4 points) Atkins and Jones Exercise 1.90. You do not need to justify your answers (but you should be able to!).
2. (3 points) Exercise 1.92 (part (a) only). Here, you do need to explain your answer.
3. (8 points) Rank order each of the following sets of atoms in order of increasing first ionization energy (IE_1). (a) N, B, Ne; (b) Br, Rb, Se; (c) As, Sb, Sn. Briefly explain your answers qualitatively (that is, you should not simply cite the actual experimental values for IE_1 as your justification).
4. (6 points) Exercise 2.2. Justify your answer in detail. Note that you should be able to answer the question without using data from Appendix 2D (although you are free to do so).
5. (3 points) (Based on Exercise 2.40) The Lewis structure below was drawn for a Period 3 element E. Identify what E is, and justify your answer.



6. (9 points) Draw Lewis structures of the following ions: (a) cyanide, CN^- ; (b) tetrafluoroborate, BF_4^- ; (c) hypochlorite, ClO^- .
7. (3 points) Exercise 2.70. You do not need to justify your rankings.
8. (8 points) Exercise 2.82. Your explanation must include Lewis structures of all three species.
9. (6 points) Exercise 2.116 (not part (c)). Briefly justify each answer.

(15 points) Also turn in your ASA for the "VSEPR—Molecular Shapes" Lab with this assignment. Draw all possible resonance structures for nitrate anion (NO_3^-).