Remember 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 is possible to eliminate formal charge by invoking valence expansion (for atoms in the 3rd period and below), you should always do it! (4) 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.

Also note that formal charges are usually left off representations of three-dimensional shape.

1. Silberberg 10.18 (6 points). Draw the best Lewis structure(s) based on the formal charge rules we discussed in class. Draw as many resonance structures as you need to show all possible equivalent locations of double bonds. You do not need to label oxidation numbers.

2. Silberberg 10.26 (5 points). Copy the three structures onto your homework paper and label all non-zero formal charges. Briefly explain your choice of the most important (that is, lowest energy) resonance structure.

3. Silberberg 10.33 (18 points). You do not need to justify your answers. Hint: Remember to consider the possibility of resonance structures that make apparently different kind of bonds in reality equivalent.

For Problems 4-6, you must also draw (i) the Lewis structure and (ii) the shape of each species. Remember that when you render the shape, you should show the locations of all lone pairs on the central atom, and show if substituents are pointing into or out of the plane of the paper.

4. Silberberg 10.35 (18 points)

5. Silberberg 10.37 (16 points)

6. Silberberg 10.41 (24 points)