**CHE-2060 Drawing Lewis Structures**

**Common bonding patterns**

The bonding patterns shown here are most common for uncharged atoms. Note that S and P can have more than an octet; they, and other large atoms, are exceptions to the octet rule.







**Part A: Draw Lewis structures from abbreviated structural formulas**

Need a reminder about how to draw Lewis structures? See the guide posted with Lecture 1!

**Instructions:**

* Draw the Lewis structures of the compounds listed below and be sure to show all unbonded electron pairs (aka free pairs or lone pairs) as pairs of dots on a specific atom.
* Identify the most polar bond in the structure by drawing a polarity arrow to show distribution of electrons within that bond.
* Calculate the formal charge for each atom in the structure. If many identical atoms share the same bonding pattern you only need to calculate that formal charge once.

**Organic molecules:**

1. N2 7. C2H3Cl

2. HCN 8. HCO2H

3. HONO2 9. HNNH

4. CO2 10. C3H6

5. H2CNH 11. C3H4 (isomer of no. 6)

6. C3H4

**Structural hints** for a few of these molecules:

3. Central N bonded to a hydroxide group and two oxygen atoms.

5. Carbon and nitrogen are bonded in the center. Two hydrogen atoms are bonded to the

 carbon. And one hydrogen atom is bonded to the nitrogen.

6., 7., 10., 11. The carbons are bonded to one another and ‘decorated’ with hydrogen (and

 chlorine) atoms.

8. The central carbon is bonded to two oxygen atoms. One hydrogen atom is bonded to the

 carbon and one to an oxygen.

**Part B: Complete the Lewis dot structures of these organic molecules**

**Instructions:**

You are given the name, molecular formula and incomplete Lewis dot structure for a number of organic molecules.

For each structure, complete the Lewis dot structures by adding:

* C atoms wherever two line segments meet;
* H atoms since most are not shown here – use them all up;
* Free electron pairs where needed; and
* Double bonds where needed.

**Note:** Treat dark and dashed wedges as line segments with carbon atoms at each end.

Example: α-pinene (C10H16)

1. Nicotine (C10H14N2)





2. Caffeine (C8H10N4O2)

ß

ß

ß

ß

3. Vanillin (C8H8O3)



4. Thymol (C10H14O)



5. Piperine (C17H19NO3)

6. Capsaicin (C18H27NO3)



7. Zingiberene (C15H24)



8. Ajoene (C9H14OS3)