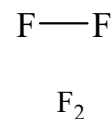
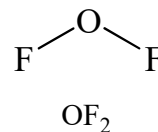
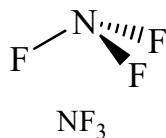
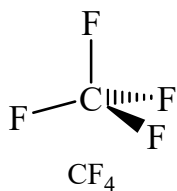
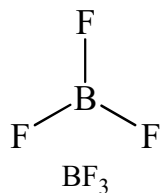


**Unit IV Homework Set**  
**General Chemistry I**

12. (*Fall 2015*) Consider the fluorine compounds shown below.



A. Which of these molecules contain polar bonds?

B. Which of these molecules are polar?

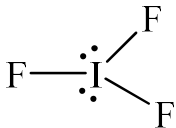
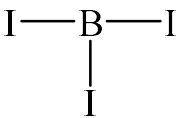
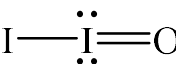
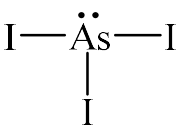
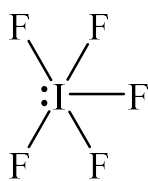
13. (*Fall 2012*) Write the best dot structure you can and assign all non-zero formal charges for the following molecules/ions. Draw a box around the structure you consider to be the best (i.e. the one you want graded).

OBrF (Br is the central atom)

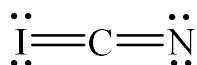
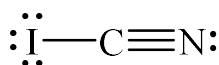
$\text{PF}_4^-$

16. (*Fall 2015*) Iodine is an important element. While its percent abundance on Earth is less than 0.05%, iodine is an essential element in biology, and iodine compounds have found numerous applications in industry and medicine.

- A. Dot structures are given below for several compounds containing iodine (lone pairs are shown only for the central atom). Draw the structure and name the molecular geometry from the following list: linear, bent, T-shaped, see-saw, trigonal pyramidal, trigonal planar, trigonal bipyramidal, square planar, square pyramidal, tetrahedral, and octahedral.

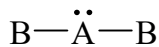
	name:
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- B. Resonance structure for the molecule ICN are given below. Assign nonzero formal charges for these dot structures.

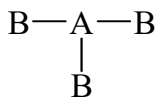


Which dot structure is the best resonance structure for ICN?

17. (**Fall 2012**) For each of the following  $AB_n$  molecules, give one of the following descriptive names for the molecular geometry (atoms only): linear, bent, T-shaped, see-saw, trigonal pyramidal, trigonal planar, trigonal bipyramidal, square planar, square pyramidal, tetrahedral, octahedral. To the right of the name, sketch the molecular geometry, using wedges for bonds coming out of the paper and dashed lines for bonds going into the plane of the paper. You only need to show the lone pairs on the central atom. Use arrows to show any expected distortions from the idealized geometry. Finally, assuming the A—B bonds are polar, indicate whether the molecule will be polar or nonpolar.



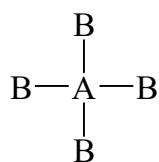

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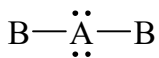

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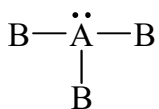

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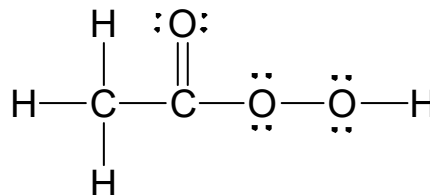



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18. (**Fall 2009**) Assign the oxidation numbers for all of the carbon and oxygen atoms in the following organic reagent:



## 20. (Fall 2009) DOT STRUCTURES

- Write the best dot structure you can and assign all non-zero formal charges for each of the following molecules/ions. Draw a box around the structure you consider to be the best (i.e. the one you want graded).
- Sketch the molecular geometry, using wedges for bonds coming out of the paper and dashed lines for bonds going into the plane of the paper. You only need to show the lone pairs on the central atom. Use arrows to show any expected distortions from the idealized geometry.
- Give a descriptive name for the molecular geometry (atoms only): bent, T-shaped, see-saw, trigonal pyramidal, trigonal planar, trigonal bipyramidal, square planar, square pyramidal, tetrahedral, octahedral.
- Give the hybridization about the central atom.

A. OBrF (Br is the central atom)

B.  $\text{NO}_3^-$ 

1. dot structure

1. dot structure

2. molecular geometry

2. molecular geometry

3. name:

\_\_\_\_\_

3. name:

\_\_\_\_\_

C.  $\text{PF}_4^-$ 

1. dot structure

2. molecular geometry

3. name:

\_\_\_\_\_

4.

21. (**Fall 2009**) Xenon forms bonds with oxygen and fluorine, but compounds containing Xe-N bonds are rare (*J. Am. Chem. Soc.* **2009**, *131*, 7272-7286). The cation  $F_3S \equiv NXeF^+$  was investigated and found to rearrange to form  $F_4S = NXe^+$ . In both ions the atoms are connected as S–N–Xe, and the multiplicity of the bonding between sulfur and nitrogen is indicated in the formulas.

A. Write a good dot structure for  $F_3S \equiv NXeF^+$  and give the molecular geometry and hybridization of the sulfur, nitrogen, and xenon atoms.

sulfur: molecular geometry \_\_\_\_\_ hybridization \_\_\_\_\_

nitrogen: molecular geometry \_\_\_\_\_ hybridization \_\_\_\_\_

xenon: molecular geometry \_\_\_\_\_ hybridization \_\_\_\_\_

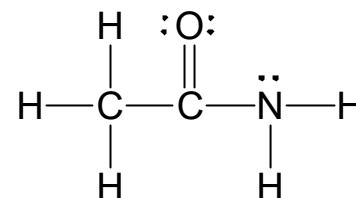
B. Write a good dot structure for  $F_4S = NXe^+$  and give the molecular geometry and hybridization of the sulfur and nitrogen atoms.

sulfur: molecular geometry \_\_\_\_\_ hybridization \_\_\_\_\_

nitrogen: molecular geometry \_\_\_\_\_ hybridization \_\_\_\_\_

22. (**Fall 2009**) A dot structure for methyl amide is shown on the right.

Draw a resonance structure for this dot structure.



Which structure do you think is the better resonance structure: the one given above, or the one you drew? Why?