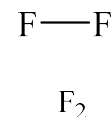
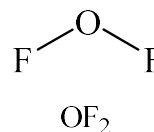
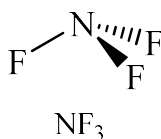
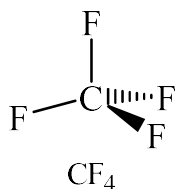
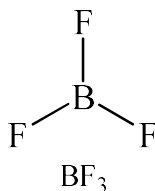


Unit IV Homework Set General Chemistry I

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



A. Which of these molecules contain polar bonds?

all except F_2 have polar bonds

B. Which of these molecules are polar?

NF_3 and OF_2

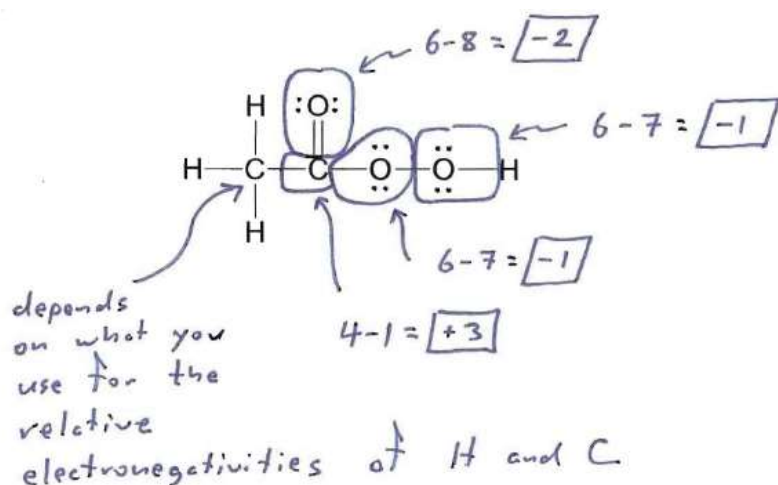
13. See Problem 20 below.

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, octahedral.

	<p>name: <i>T-shape</i></p>
	<p>name: <i>trigonal planar</i></p>
	<p>name: <i>bent</i></p>

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

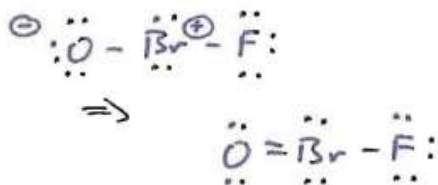


19. (Fall 2009) DOT STRUCTURES

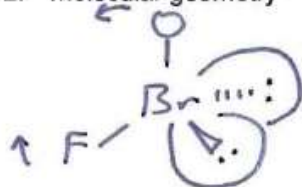
- Write the best dot structure you can and assign all non-zero formal charges for each of the following molecules/ions. Draw a box around the structure you consider to be the best (i.e. the one you want graded).
- Sketch the molecular geometry, using wedges for bonds coming out of the paper and dashed 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.

OBrF (Br is the central atom)

1. dot structure $6 + 7 + 7 \Rightarrow 20 e^-$



2. molecular geometry



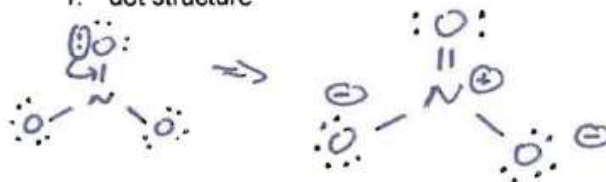
3. name:

bent

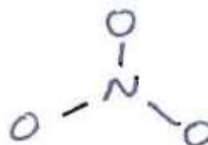
4. hybridization: sp^3

NO_3^- $5 + 6 + 6 + 6 + 1 = 24 e^-$

1. dot structure



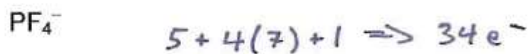
2. molecular geometry



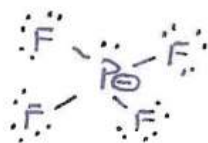
3. name:

trigonal planar

4. hybridization: sp^2



1. dot structure



2. molecular geometry



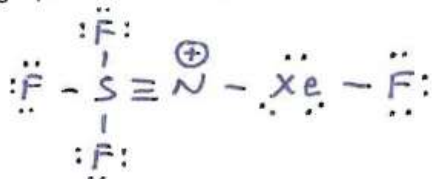
3. name:

see-saw

4. hybridization: sp^3d

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 $\text{F}_3\text{S}=\text{NXeF}^+$ was investigated and found to rearrange to form $\text{F}_4\text{S}=\text{NXe}^+$. 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.

1. Write a good dot structure for $\text{F}_3\text{S}=\text{NXeF}^+$ and give the molecular geometry and hybridization of the sulfur, nitrogen, and xenon atoms.

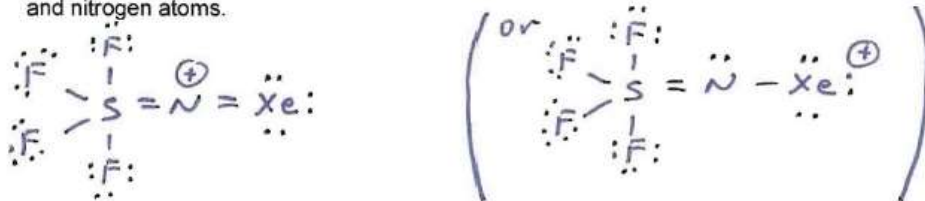


sulfur: molecular geometry tetrahedral hybridization sp^3

nitrogen: molecular geometry linear hybridization sp

xenon: molecular geometry linear hybridization sp^3d

2. Write a good dot structure for $\text{F}_4\text{S}=\text{NXe}^+$ and give the molecular geometry and hybridization of the sulfur and nitrogen atoms.



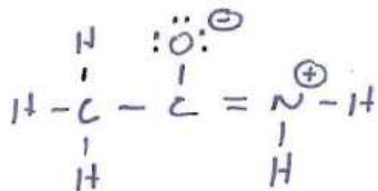
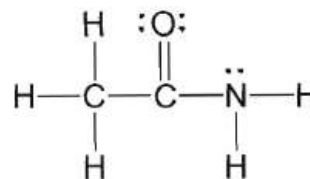
sulfur: molecular geometry trigonal bipyramidal hybridization sp^3d

nitrogen: molecular geometry linear (bent) hybridization $sp(sp^2)$

22. (Fall 2009, e4) A dot structure for methyl amide is shown on the right.

(8 points) 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 best resonance structure: the one given above, or the one you drew? Why?

the one given since it minimizes formal charge