

Honors Chemistry

Molecular Geometry Practice 2

hcmolgeo2prac08.doc

Name: Key Date: _____ Period: _____

1. With regard to the structure below, answer the following questions a-h:



a. Draw in all nonbonding electron pairs on the molecule.

b. What is the electronic geometry with respect to:

the nitrogen atom? tetrahedral

the oxygen with single bonds? tetrahedral

c. What is the molecular geometry with respect to:

the nitrogen atom? trigonal pyramidal

the oxygen with single bonds? bent

d. What are the bond angle(s) around:

the nitrogen atom? $\sim 109.5^\circ$

the carbon labeled with an "a" in the diagram? 120°

e. Which atoms, if any, have a formal charge other than zero? None

f. What is the hybridization with respect to:

the nitrogen atom? sp^3

the carbon labeled with a "a"? sp^2

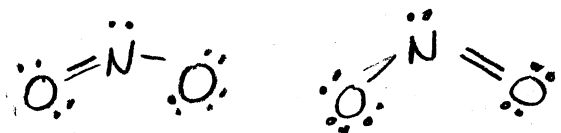
g. Which atoms, if any, do not obey the octet rule (or the duet rule in the case of hydrogen)?

None

h. With respect to the whole molecule:

Total sigma bonds: 13 Total pi bonds: 2

2. Draw a reasonable Lewis dot structure for the **nitrite** polyatomic ion in the space below. If resonance exists, draw all resonant structures.



a. What is the bond order with respect to the central nitrogen atom? $1\frac{1}{2}$

b. What is the electronic geometry of the molecule? trigonal planar

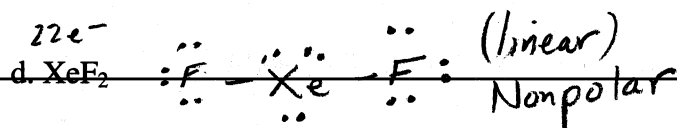
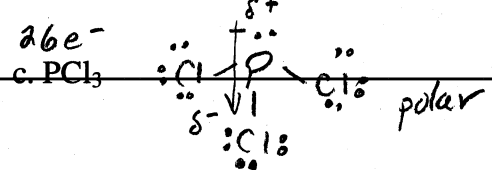
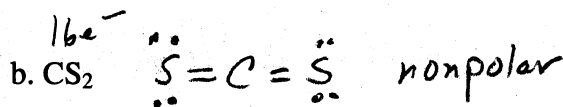
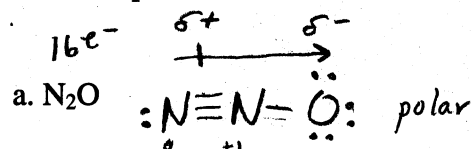
c. What is the molecular geometry of the molecule? bent

3. What are two clues that a molecule might be polar? List any cautions that must be exercised when using these clues.

Dissimilar attached outer atoms (except if EN is the same)

Nonbonding pairs on the central atom (except if the nonbonding pairs are symmetrically arranged or consist of the same atoms (as in O_3))

4. Draw a Lewis structure for each of the following molecules and indicate which ones should be polar. For each polar molecule, indicate the direction of the dipole using the arrow and delta +/- notation.



5. Under what conditions can an element develop an expanded valence?

The atom's valence level must contain a d-sublevel (whether or not any of its valence electrons initially exist in that sublevel)
(3rd energy level or greater)