1. (8 points) Given the Condensed formula O-N-C-N
   1. Draw a reasonable Lewis structure showing all lone pairs and formal charges where relevant:
   2. Draw a resonance form for the above Lewis structure including formal charge and lone pairs where relevant:
   3. Determine the number of sigma and pi bonds with in the original Lewis structure

Sigma bonds \_\_\_\_\_\_\_\_\_\_\_\_\_\_ pi bonds \_\_\_\_\_\_\_\_\_\_

1. (6 points) Answer the following questions:

Molecular geometry C\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Orbital geometry S \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bond angle S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Molecular geometry N\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hybridization N\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Orbital geometry P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (3 points) Identify each of the organic functional groups indicated in the following molecule.



1. (3 points) Given the following molecules

1. CH3-O-CH3 2. CF4 3. CH3-NH-CH3  4. SiO2

Place the following substances in order of increasing boiling points:

Boiling Point

Lowest \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ Highest