

# Chem 51A – SSI 2014

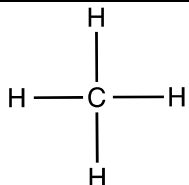
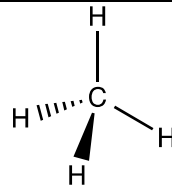
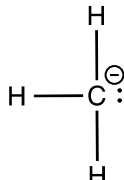
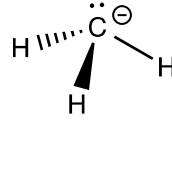
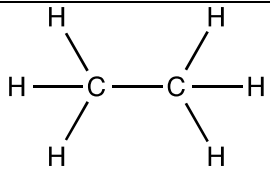
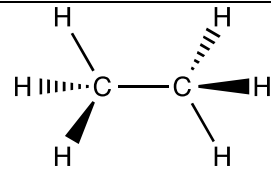
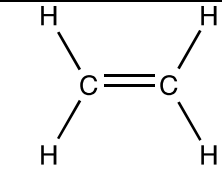
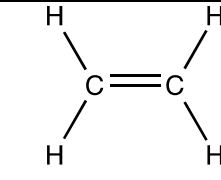
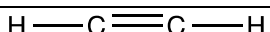
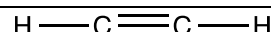
## Discussion 1 Worksheet

Dr. Renee Link

This worksheet will focus on concepts to be discussed or already discussed, for Chapter 1. Those concepts being 1) Lewis Structures 2) Formal Charge and 3) Bonding and Geometry.

On a practical note, we **STRONGLY** recommend you work on these sheets using erasable pencil.

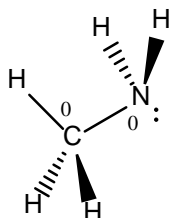
### 1. Bonding and Geometry

<u>Molecular Formula</u>	<u>Lewis Structure</u>	<u>VSEPR Structure</u>	<u>Geometry</u>	<u>Bond Angles</u>	<u>Hybridization</u>
Methane: CH <sub>4</sub>			tetrahedral	109.5	sp <sup>3</sup>
Methyl Anion: CH <sub>3</sub> <sup>-</sup>			Trigonal pyramidal	<109.5	sp <sup>3</sup>
Ethane: CH <sub>3</sub> CH <sub>3</sub>			tetrahedral	~109.5	sp <sup>3</sup>
Ethene: CH <sub>2</sub> CH <sub>2</sub>			trigonal planar	<u>C-C-H</u> 121.7  <u>H-C-H</u> 116.6  ~120	sp <sup>2</sup>
Ethyne: CHCH			linear	180	sp

## 2. Lewis Structures, formal charge, etc.

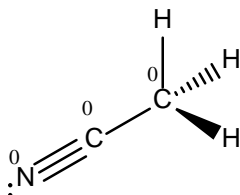
For each of the following, draw valid Lewis structures (there may be more than one valid structure), label formal charges, show the VSEPR structure (this was a poorly defined part of the question...sorry), and point out which is the most electronegative atom.

A.  $\text{CH}_5\text{N}$



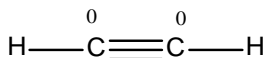
N is most electronegative

B.  $\text{CH}_3\text{CN}$



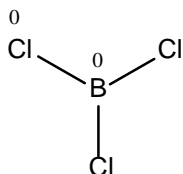
N is most electronegative

C.  $\text{C}_2\text{H}_2$



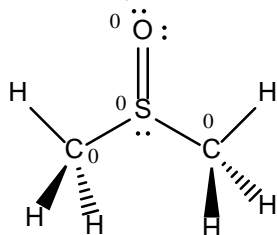
C is most electronegative

D.  $\text{BCl}_3$



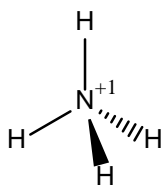
Cl is most electronegative

E.  $\text{C}_2\text{H}_6\text{SO}$  (Several correct structures...shown below is the one I had in mind)



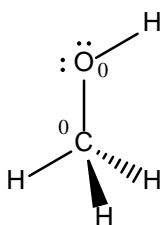
O is most electronegative

F.  $\text{NH}_4^+$



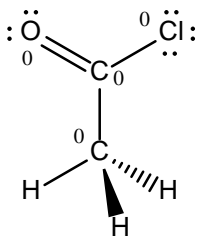
N is most electronegative

G.  $\text{CH}_3\text{OH}$



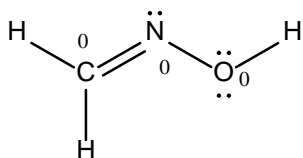
O is most electronegative

H.  $\text{CH}_3\text{COCl}$



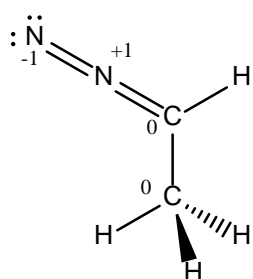
Cl is most electronegative

I.  $\text{CH}_2\text{NO}$  (Mistake...needs to be  $\text{CH}_3\text{NO}$ )

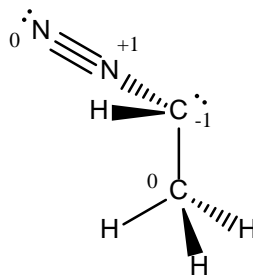


O is most electronegative

J.  $\text{CH}_3\text{CHN}_2$

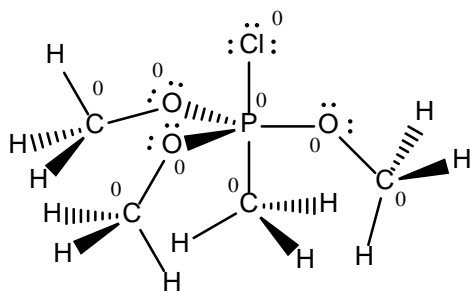


OR



N is most electronegative

K.  $(\text{CH}_3\text{O})_3\text{P}(\text{CH}_3)\text{Cl}$  [This is called a Wittig salt. Hint: P can have more than a full octet]



O is most electronegative

These molecules get ugly fast if you draw in all of the atoms like this, so we need a better way to draw them without losing any of the information...next lecture!