**Exercise #3:** **Practice with the Language of Pauling’s Valence Hybrid Model (spn)**

#  Organic Chem I Alfred State College

**3.1. (s,p) atomic shapes vs. (s, p) molecular combos**

 **Un- hybridized atomic shapes shape when hybridized in molecule**

**s + 1 (one) p**

**s + 2(two) p**

**s + 3 (three) p**

**3.2 Describe the hybridization on the indicated atoms in the molecules below**

**N**H3 \_\_\_\_\_\_\_ on **N** **N**O2- \_\_\_\_\_\_\_\_ on **N**

**CO** \_\_\_\_\_\_ on **C** **CO**2 \_\_\_\_\_\_\_\_ on **C**

 \_\_\_\_\_\_ on **O** \_\_\_\_\_\_\_\_ on **O**

H2**CO** \_\_\_\_\_\_ on **C** **C**H3**O**H \_\_\_\_\_\_\_\_ on **C**

(formaldehyde) (methanol)

 \_\_\_\_\_ on **O**  \_\_\_\_\_\_\_\_ on **O**

 (a) (b) (a)

H**C**≡**C**H \_\_\_\_\_ on **C** **C**H3-**C**-**C**H3  \_\_\_\_\_\_\_\_\_\_\_ on **Ca**

(acetylene) ||

 **O** \_\_\_\_\_\_\_\_ on **Cb**

(acetone)

\_\_\_\_\_\_\_\_\_\_\_ on **O**

**3.3 List the C valence atomic orbitals (AO) involved in making the σ (sigma)**

 **bond linkages in ethene assuming the x,y, z axes are defined as below:**



 z

x AO involved in σ\_\_\_\_\_\_\_

 y

How many sigma bonds are shown here ?\_\_\_\_\_\_

Sketch how and where the π (pi) bond in ethene forms and identify the p orbital involved assuming the x,y,z axes orientations below:



 C C C C

 uncombined p combined as π orbital