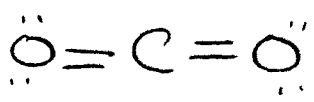
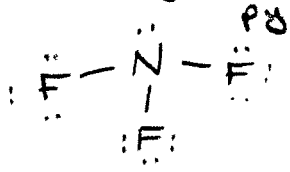
Draw an electron dot structure for each of the following molecules or ions:

1) CO_2

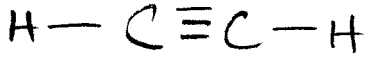
linear



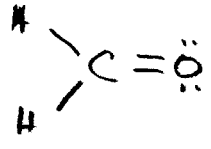
2) NF_3 trigonal pyramidal



3) C_2H_2

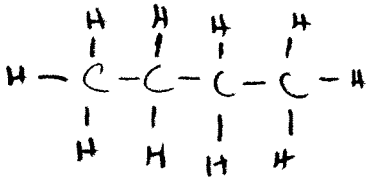


4) CH_2O

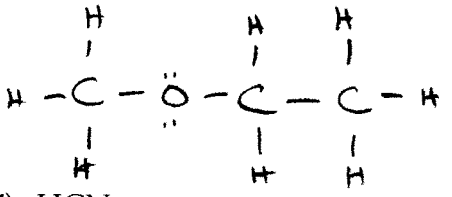


trigonal planar

5) C_4H_{10}



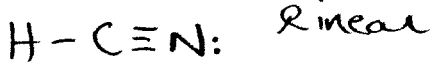
6) $CH_3OCH_2CH_3$



O = bent

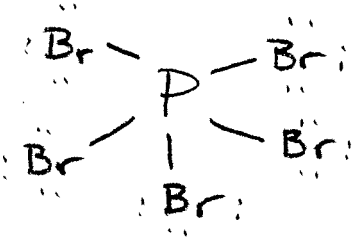
C (all 3) = tetrahedral

7) HCN



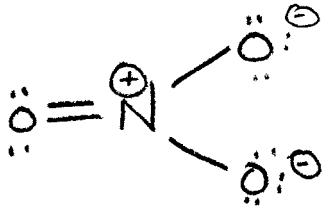
linear

8) PBr_5



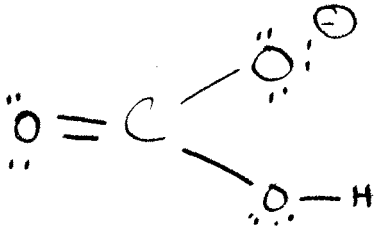
trigonal bipyramidal

9) NO_3^-



trigonal planar

10) HCO_3^-

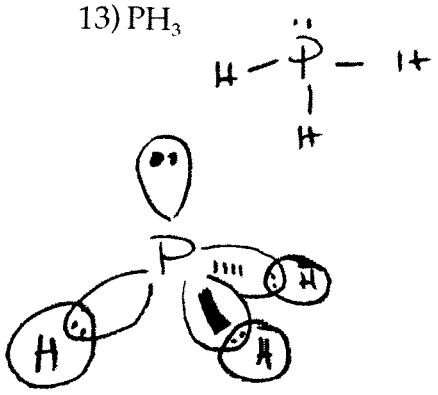


11) Indicate the SHAPE with respect to the CENTRAL ATOM for #'s: 1,2,4,7,8,9. Write next to structure.

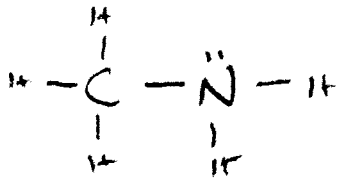
12) Indicate the SHAPE with respect to the OXYGEN and the $-CH_2-$ CARBON in #6. Write next to structure.

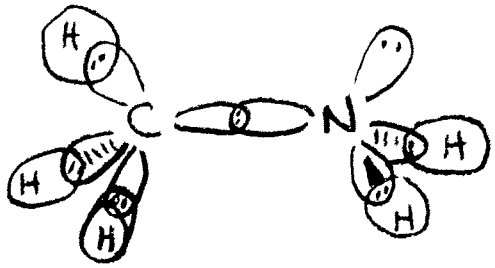
Draw an orbital overlap diagram for the following molecules:

13) PH_3

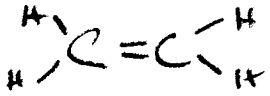


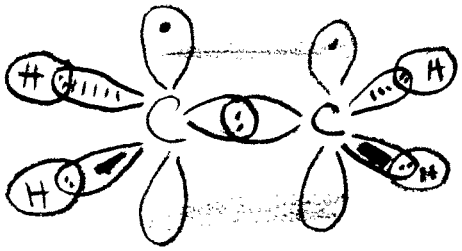
14) CH_3NH_2



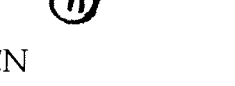


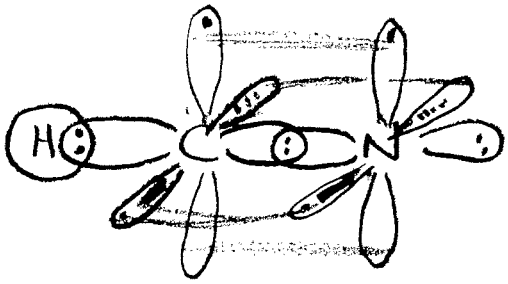
15) C_2H_4





16) HCN





17) Consider water, H_2O

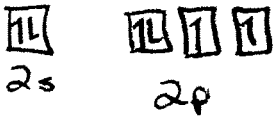
A) Write the electron configuration for O. $1s^2\ 2s^2\ 2p^4$

B) Draw the valence shell Aufbau Diagram for oxygen.

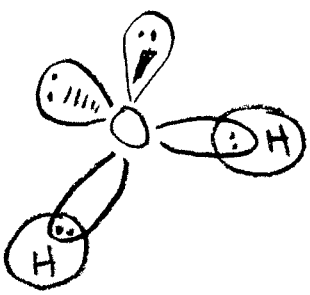
C) Explain why this atomic orbital arrangement cannot account for the observed bonding in H_2O

D) Explain briefly the hybridization that must take place. Draw the new Aufbau Diagram for the hybridized oxygen.

E) Draw the orbital overlap diagram for water.

B) 

C) AO arrangement would suggest 90° bond ∠'s for HOH bonds. However ≈105° ∠'s are observed

E) 

D) 2s & three 2p orbitals hybridize to make 4 identical sp^3 orbitals to allow electrons to maximize their distance from other e's.