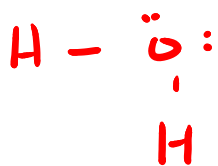


17)  $H_2O$  (8e-)

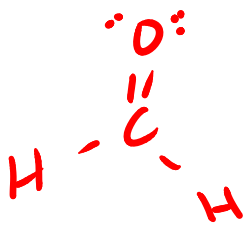


- tetrahedral electron arrangement

- bent shape

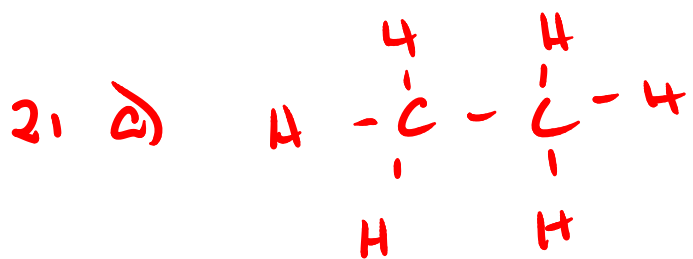
- bond angle  $< 109.5^\circ$

- oxygen atom requires  $sp^3$  hybridization
- the two O-H bonds form from overlap of the  $sp^3$  hybrid orbitals of O with the 1s atomic orbitals from hydrogen
- each O-H covalent bond is called a sigma bond



- trigonal planar arrangement of the electron pairs that requires  $sp^2$  hybridization

- the two C-H sigma bonds form from overlap of the  $sp^2$  hybrid orbitals from C with the hydrogen 1s orbital
- the double bond between carbon and oxygen consists of 1 sigma and 1 pi bond.
- the oxygen atom trigonal planar arrangement of its electrons
- the sigma bond in the double bond forms from overlap of a carbon  $sp^2$  hybrid orbital with an oxygen hybrid orbital
- the  $\pi$  bond in the double bond forms from overlap of the unhybridized p orbitals

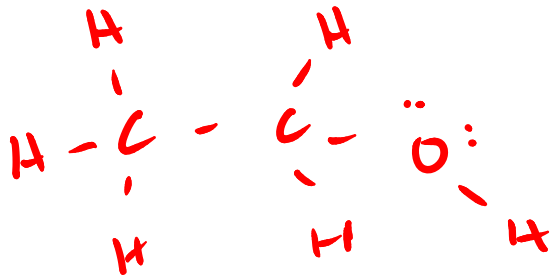


ethane

- the carbon atoms have  $sp^3$  hybridization

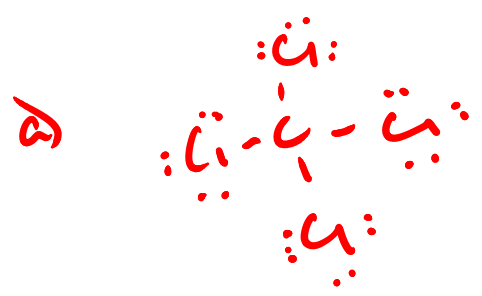
- the six C-H bonds form from the overlap of the  $sp^3$  hybrid orbitals of carbon with the 1s orbital of Hydrogen

- the carbon-carbon sigma bond forms from the overlap of an  $sp^3$  hybrid orbital from each C atom

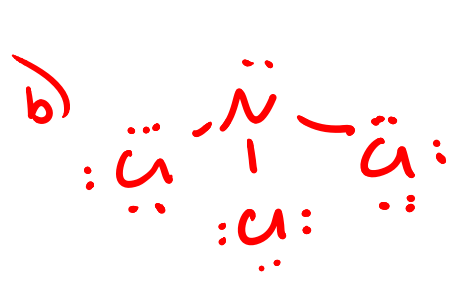


- the two carbons and oxygen each have  $sp^3$  hybridization
- the C-H and O-H sigma bonds form from the overlap of  $sp^3$  hybrid orbitals with hydrogen 1s orbital
- the C-C and C-O sigma bonds form from overlap of  $sp^3$  hybrid orbitals from each atom

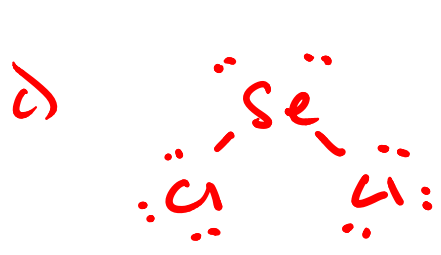
23)  
Q.81



$sp^3$



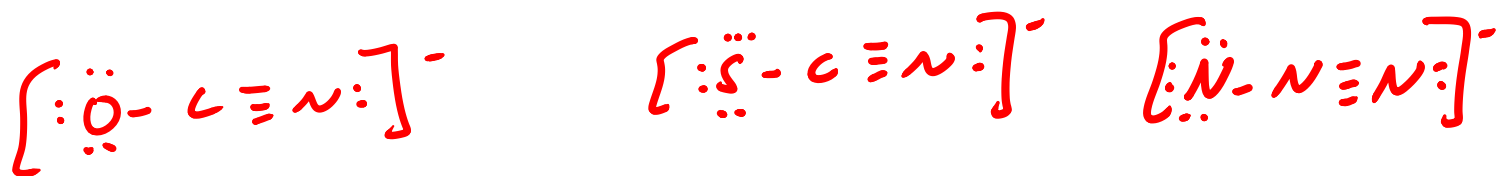
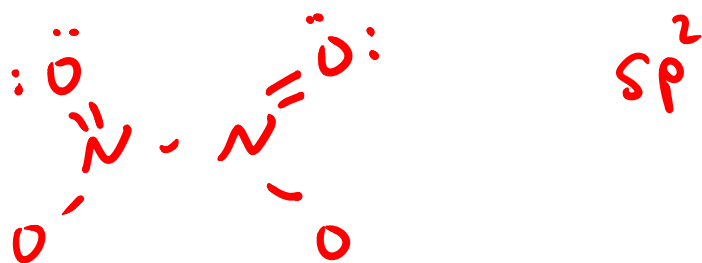
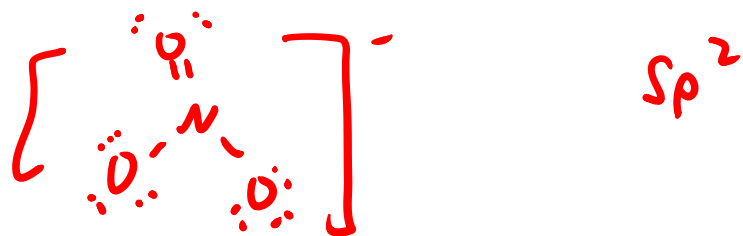
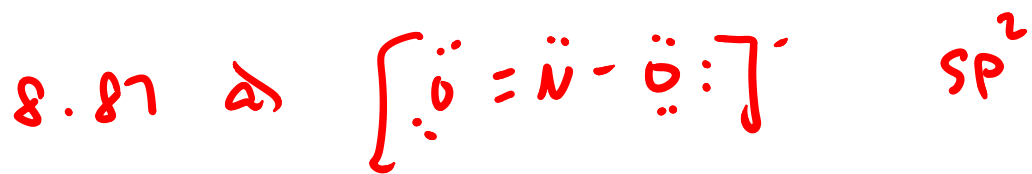
$sp^3$



$sp^3$

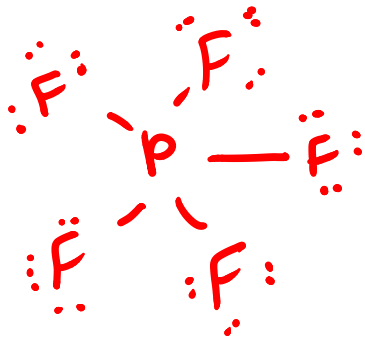


both are  $sp^3$

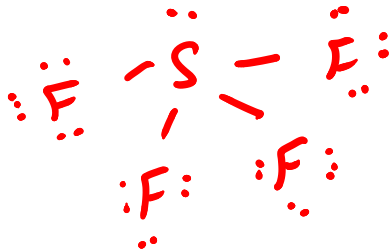


all are  $sp$

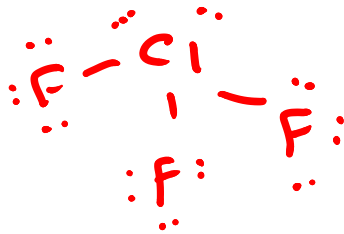
2s) 8.85  
PF<sub>5</sub>



SF<sub>4</sub>



ClF<sub>3</sub>



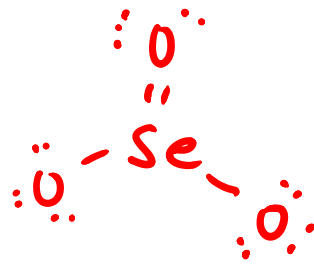
Br<sub>3</sub><sup>-</sup>



an

d sp<sup>3</sup>

27)  
8.107)  $\text{SeO}_3$

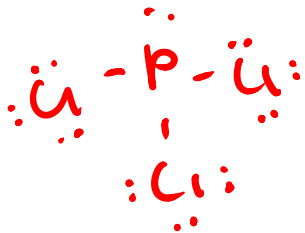


$\text{sp}^2$

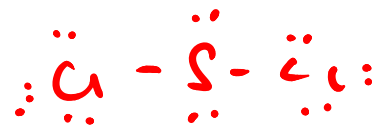
$\text{SeO}_2$



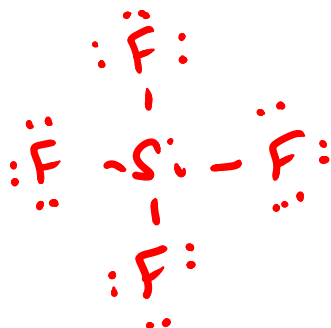
8.108)  $\text{PCl}_3$  (26e $\cdot$ )



$\text{SCl}_2$  (20e $\cdot$ )



$\text{SF}_4$  (32e $\cdot$ )



$\text{sp}^3$