

# Non Sibi High School

Andover's Chem 300: Accelerated/Honors Chemistry

## Chapter 11, Review Quiz 1 Answers

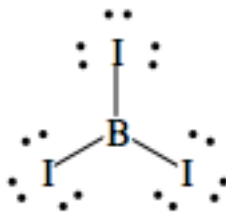
### 1

Draw the Lewis structure, name the molecular geometry (shape), draw a three-dimensional sketch, and indicate the bond angle for each of the following molecules and ions. Also state whether the neutral molecules are polar or nonpolar.

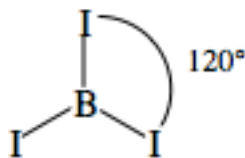
- a.  $\text{BI}_3$
- b.  $\text{CH}_2\text{Br}_2$
- c.  $\text{FNO}$
- d.  $\text{H}_3\text{O}^+$
- e.  $\text{OCS}$
- f.  $\text{PCl}_4^+$
- g.  $\text{SF}_2$

a.

Lewis structure:

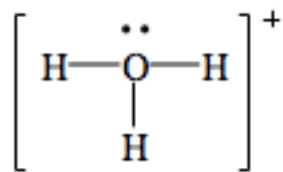


$\text{AB}_3$  = trigonal planar, 3-D sketch:

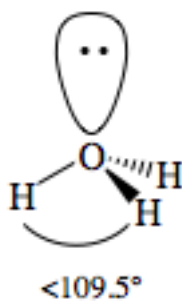


nonpolar molecule



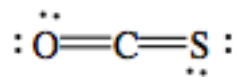


AB<sub>3</sub>E<sub>1</sub> = trigonal pyramidal, 3-D sketch:

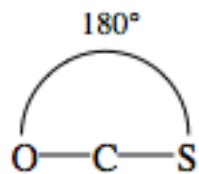


e.

Lewis structure:



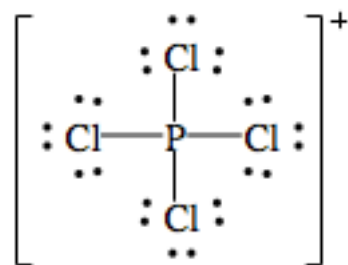
AB<sub>2</sub> = linear, 3-D sketch:



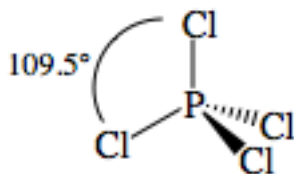
polar molecule (different outer elements)

f.

Lewis structure:

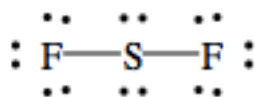


AB<sub>4</sub> = tetrahedral, 3-D sketch:

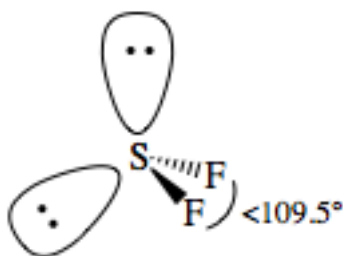


g.

Lewis structure:



AB<sub>2</sub>E<sub>2</sub> = bent, 3-D sketch:



polar molecule

## 2

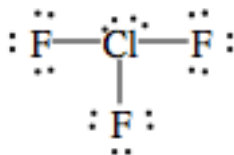
Draw the Lewis structure, name the molecular geometry (shape), draw a three-dimensional sketch, and indicate the ideal bond angle(s) for each of the following

molecules and ions. Also state whether the neutral molecules are polar or non-polar.

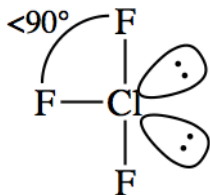
- a.  $\text{ClF}_3$
- b.  $\text{IF}_5$
- c.  $\text{KrF}_2$
- d.  $\text{PCl}_4^-$
- e.  $\text{SF}_5^+$
- f.  $\text{SeF}_6$
- g.  $\text{XeCl}_4$

a.

Lewis structure:



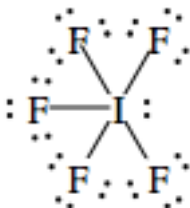
$\text{AB}_3\text{E}_2 = \text{T-shaped}$ , 3-D sketch:



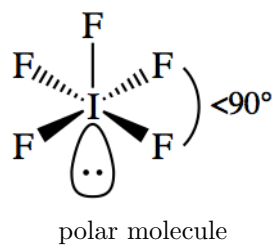
polar molecule

b.

Lewis structure:

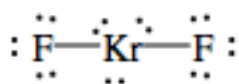


$\text{AB}_5\text{E}_1 = \text{square pyramidal}$ , 3-D sketch:

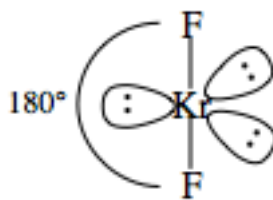


c.

Lewis structure:



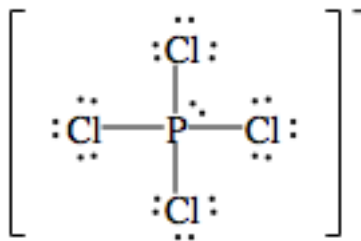
$\text{AB}_2\text{E}_3$  = linear, 3-D sketch:



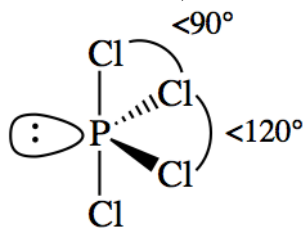
nonpolar molecule

d.

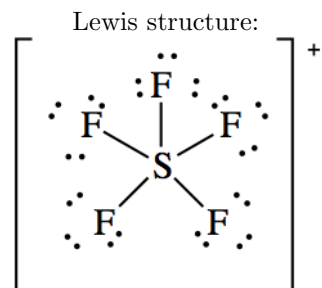
Lewis structure:



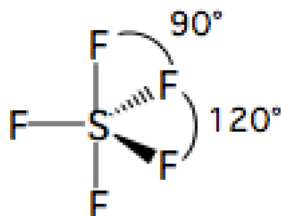
$\text{AB}_4\text{E}_1$  = seesaw, 3-D sketch:



e.

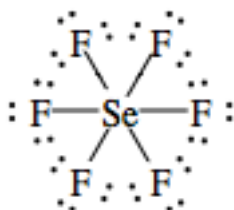


AB<sub>6</sub> = trigonal bipyramidal, 3-D sketch:

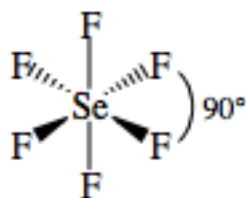


f.

Lewis structure:



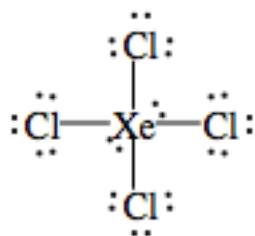
AB<sub>6</sub> = octahedral, 3-D sketch:



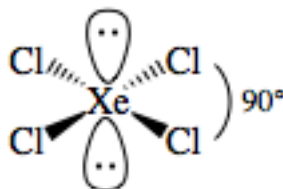
nonpolar molecule

g.

Lewis structure:



$AB_4E_2 = \text{square planar, 3-D sketch:}$



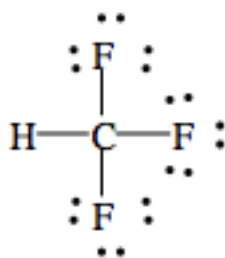
nonpolar molecule

### 3

Draw the Lewis structure and indicate the center atom hybridization for each of the following molecules and ions:

- $\text{CHF}_3$
- $\text{NO}_2^+$
- $\text{NO}_3^-$

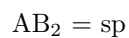
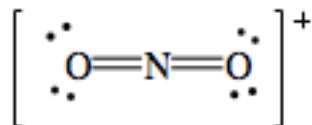
a.



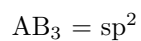
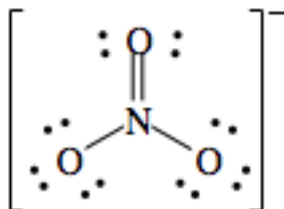
$AB_4 = sp^3$

b.



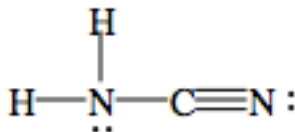


c.



4

Draw the Lewis structure for  $\text{NH}_2\text{CN}$  that has no formal charges and determine the number of sigma and pi bonds in the molecule.



$$3 \text{ single} + 1 \text{ triple} = 3 \sigma + 1(1 \sigma + 2 \pi) = 4 \sigma \text{ bonds} + 2 \pi \text{ bonds}$$



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