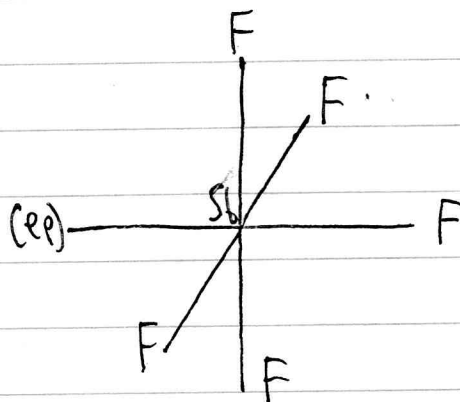


Example: VSEPR SbF_5

Q: Answer the following questions about the compound antimony pentafluoride dianion: Construct the structure of SbF_5^{2-} . Begin by selecting an option

A:



Octahedral.

- Q:
- Name the electron distribution about the central atom.
 - Name the type of hybrid orbitals the central atom forms.
 - Name the molecular geometry of the ~~atom~~ compound.
 - State whether the molecule is polar or non-polar

A:

- Octahedral

- sp^3d^2

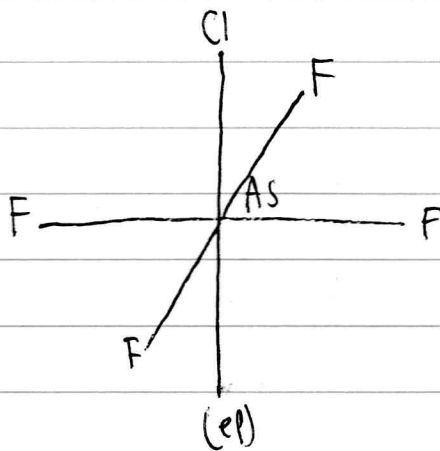
- Square pyramidal

- Polar

Example: VSEPR AsClF_4^{2-}

Q: Construct the correct structure for AsClF_4^{2-} . Construct the molecule is oriented vertically up or vertically down.

A:



Q: Name the type of hybrid orbitals the central atom forms.
 Name the molecular geometry of the compound.
 State whether the molecule is polar or non-polar.
 Which of the following provides the best estimate of the Cl-As-F ~~Bond~~ ^{Angle} bond angle in this molecule.

A: sp^3d^2

• Square pyramidal

• Polar

• Slightly less than 90° .

Q: Calculate the maximum wavelength, in meters, of EM radiation capable of breaking the weakest bond in AsClF_4^{2-} .

$$\sqrt{E_{\text{As-As}} E_{\text{F-F}} + 96.3} = E_{\text{As-F}}$$

$$481.718 \frac{\text{kJ}}{\text{mol}} =$$

$$8 \cdot 10^{-19} \frac{\text{J}}{\text{bond}} = h \frac{c}{\lambda}$$

$$\Rightarrow \lambda = 248.306 \text{ nm}$$

$$= 2.48 \cdot 10^{-7} \text{ m}$$

Example: Dichloroallene

Q: 1,1-dichloroallene has the chemical formula
 $\text{CH}_2=\text{C}=\text{CCl}_2$

What are the hybridizations of the left, middle, and right carbons as seen in the formula?

A: Left: sp^2

Middle: sp

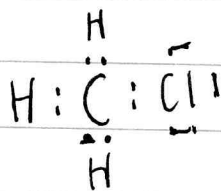
Right: sp^2

Example: Structure of CH_3Cl

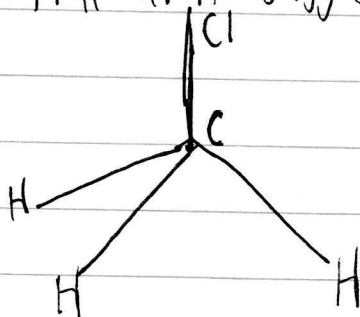
Q: Carbon reacts with chlorine and hydrogen to form the compound CH_3Cl .

Construct the structure of CH_3Cl :

A: Consider its Lewis structure



4 ligands on a central atom suggests tetrahedral,



Q: What is the dominant form of secondary bonding for CH_3Cl ?

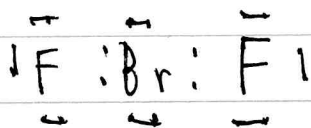
A: ~~X~~ Dipole - Dipole interactions
London dispersion forces
covalent bonding
~~ionic bonding~~

Secondary bonding is defined as the ~~bonds in a universe consist~~
the bonds where no electrons are shared or transferred.
Dipole - Dipole follows as it is the only attractive force remaining.

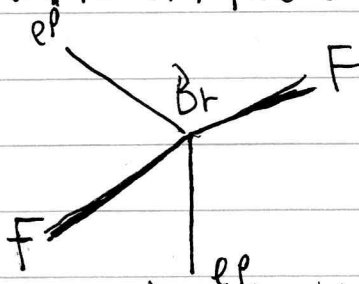
Example: VSEPR BrF_2^+

Q: Construct the structure of BrF_2^+ , ~~beginning by selecting an~~

4: BrF_2^+ has the lewis structure



where of course the positive charge was attained by pulling an electron off the Br; then in 3d we have



tetrahedral ~~and~~ ^{rep} due to the electron pairs on the Br.

- a:
 - Name the electron distribution about the central atom.
 - Name the type of hybrid orbitals the central atom forms.
 - Name the molecular geometry of the compound.
 - State whether the molecule is polar or non-polar.

- Ai:
- Tetrahedral
 - sp^3
 - Bent
 - Polar

Example: Boiling point comparison between Ar and HCl

Q: Identify the compound with the lower boiling point:

A:

X	Ar
	HCl

Example: Secondary Bonding Comparison

Q: For each molecule listed below, identify the dominant form of Secondary bonding:

- NH_3
- CCl_4
- HCl

A:

- Hydrogen Bonding
- London Dispersion Forces
- Dipole interactions.

Example: Rankings of boiling points

Q: Rank the following 3 compounds in terms of increasing boiling point: CH_4 , CH_2Cl_2 , CCl_4 .

• Rank the following 3 compounds in terms of increasing boiling point: CF_4 , CH_4 , CH_2F_2

• Water is a liquid at room temperature and ~~and~~ H_2Se is a homologue compound. At room temperature what state is it in?

A: • ~~CH_4~~ , CH_4 , CH_2Cl_2 , CCl_4

• CH_4 , CF_4 , CH_2F_2

• Gas; due to no hydrogen bonding holding it liquid.