

Problem Set – September 25

1. Use VSEPR theory to predict the shape of $\text{PH}_3(\text{g})$.
2. Draw three resonance structures for phosgene, $\text{CCl}_2\text{O}(\text{g})$ a toxic gas.
3. For each of the following molecules:
 - i) Draw the Lewis structure and the molecular shape.
 - ii) Indicate the direction of any bond dipoles with vectors.
 - iii) Add the dipoles and determine if a molecular dipole exists.

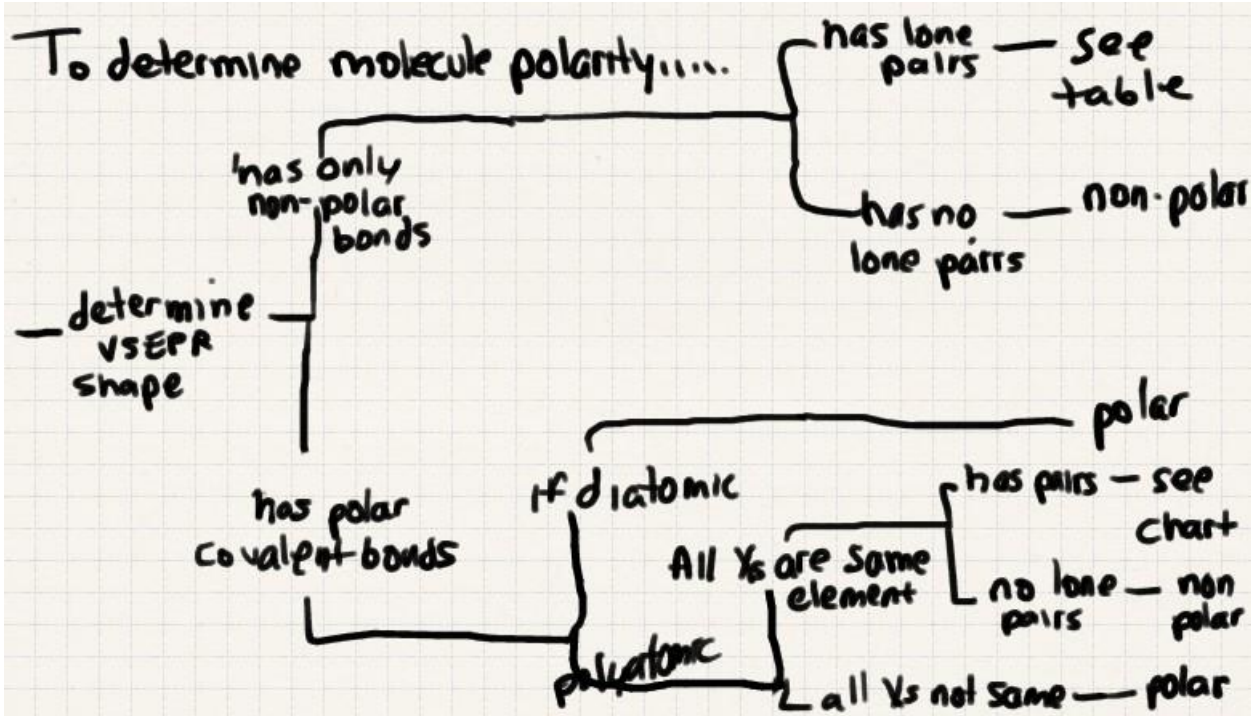
- | | | | |
|------------------|---------------------------|--------------------------|----------------------------|
| a) LiF | d) Cl_2 | g) BCl_3 | j) BF_2H |
| b) CH_4 | e) NH_3 | h) BeH_2 | h) SFCl_5 |
| c) HCl | f) N_2F_4 | i) H_2Se | i) CH_2F_2 |

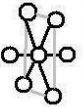
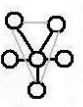
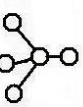
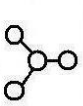
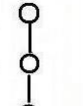

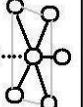
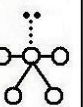
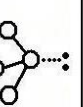
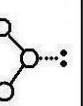
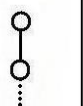

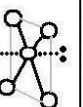
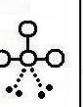
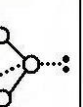
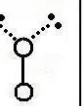
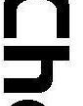

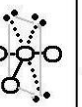
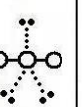




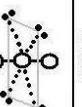
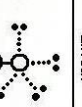




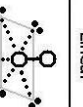









































4. Which of the following molecules has a molecular dipole?

- | | | | |
|----------------------|-----------------------------|-----------------------|------------------------|
| a) NaF (g) | b) MgO (g) | c) MgI_2 (g) | d) GaCl_3 (g) |
| e) CO_2 (g) | f) H_2S (g) | g) CCl_4 (g) | h) PF_3 (g) |

5. Compounds of Group 18 elements do not form in nature, but chemist can synthesize such compounds in the lab. One example is xenon tetroxide, $\text{XeO}_4(\text{g})$, which contains co-ordinate covalent bonds. Draw the Lewis structure for a molecule of xenon tetroxide.





Steric Number → Lone Pairs ↓	6		5		4		3		2		1	
	Octahedral	sp^3d^2 90°	Trigonal Bipyramidal	sp^3d 90°/120°	Tetrahedral	sp^3 109.5°	Trigonal Planar	sp^2 120°	Linear	sp 180°	Linear	undefined
0	Non-Polar 	Non-Polar 	Non-Polar 	Non-Polar 	Non-Polar 	Non-Polar 						
	Square Pyramidal 	Seesaw (distorted tetrahedron) 	Trigonal Pyramidal 	Bent 	Linear 	Linear 						
1	Polar 	Polar 	Polar 	Polar 	Polar 	Polar 						
	Square Planar 	T-Shaped 	Bent 	Linear 	Linear 	Linear 						
2	Non-Polar 	Polar 	Polar 	Polar 	Polar 	Polar 						
	Non-Polar 	Linear 	Linear 	Linear 	Linear 	Linear 						
3	Polar 	Non-Polar 	Non-Polar 	Non-Polar 	Non-Polar 	Non-Polar 						
	Polar 	Linear 	Linear 	Linear 	Linear 	Linear 						
4	Non-Polar 	Linear 	Linear 	Linear 	Linear 	Linear 						
	Non-Polar 	Linear 	Linear 	Linear 	Linear 	Linear 						
5	Polar 	Linear 	Linear 	Linear 	Linear 	Linear 						
	Polar 	Linear 	Linear 	Linear 	Linear 	Linear 						

Advance Placement

Chemistry

Geometries

Hybridizations

And Angles

