Chapter 6 and 7 Review

1. Fill in the chart listing the unique characteristics of ionic compounds and molecular compounds and what they also have in common.

Ionic	Compare	Molecular
1) HIGH BOILING POINT / melting points	1) BOTH FORM COMPOUNDS	1) NONMETALS + NONMETALS
2) METALS BONDED TO NON METALS	2) BOTH INVOLVE ATOM TO ATOM INTERACTION	2) USE PREFIXES IN THE NAME
3) CAN HAVE POLYATOMIC ION	3) GIVE MATTER STRUCTURE	3) MADE OF COVALENT bonds
4) ELECTRONS ARE GIVE AND TAKE NOT SHARED	4)	4)

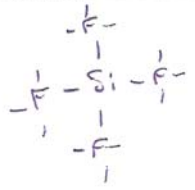
2. For each of the following bonds determine if they are polar or nonpolar. Draw in Dipole arrows and assign partial charges.

1) Cl – Cl NP
2) H – F δ^+ δ^-
3) H – I δ^+ δ^-
4) Br – Br NP
5) Br- I δ^- δ^+

Which bonds are the most polar and why?
H and F ARE MOST POLAR BECAUSE the Fluorine is the most electronegative element on the periodic table. The larger the difference in electronegativity the larger the polarity.

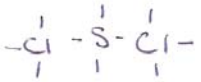
3. Draw the Lewis structure for the following molecules. Assign each molecule its specific geometry, hybridization and determine if it is a polar or nonpolar molecule.

1) Silicon Tetrafluoride
Formula: SiF_4



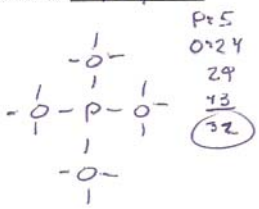
Geometry: TETRAHEDRAL
Polar or Nonpolar
Hybridization: sp^3

2) Sulfur Dichloride
Formula: SCl_2



Geometry: Bent or ANGULAR
Polar or Nonpolar
Hybridization: sp^3

3) Phosphate Ion $^{3-}$
Formula: PO_4



Geometry: tetrahedral
Polar or Nonpolar
Hybridization: sp^3

4. Discuss VSEPR theory and use its definition to explain why the bond angle for the bent water molecule is 105° and the bond angle for the trigonal pyramid NH_3 is 107°.
Electron pair repell each other. IN H_2O there are two ~~unpaired~~ lone pairs of electrons. IN NH_3 there ~~are~~ is only one lone pairs. The lone pairs have a stronger (-) charge and pinch the bond ANGLE TO a greater extent in H_2O.

5. What are the conditions necessary for Hydrogen Bonding to occur between molecules?

- Hydrogen must be bonded to N, O, F IN the molecule.
- Hydrogen must then attract a lone pair of electrons in an adjacent molecule

6. Using the intermolecular forces discussed in class discuss why NH_3 has a boiling point 130° higher than CH_4.

NH_3 is pyrimidal  and polar. CH_4  is tetrahedral and nonpolar. Therefore the stronger IMF IN NH_3 gives a larger boiling point. NH_3 ALSO IS CAPABLE OF H-bonding which also ↑ boiling point.

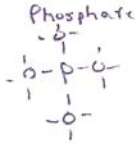
7. Complete the chart: (attach separate sheet for work if needed)

Compound Name	Ionic or Molecular	Chemical Formula
Bromine Pentafluoride	Molecular	BrF_5
Copper (II) Phosphate	~~$Cu_3(PO_4)_2$~~ Ionic	$Cu_3(PO_4)_2$
Tin (IV) Sulfite	Ionic	$Sn(SO_3)_2$
Tetraphosphorous Hexasulfide	Molecular	P_4S_6

8. Draw the Lewis structure and name each compound below.

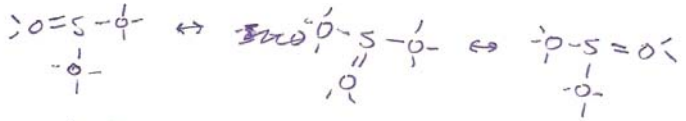
a. PO_4^{3-}

Phosphate



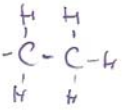
b. SO_3

Sulfur trioxide



c. C_2H_6

(remember H is not a central Atom)



d. HCN