

Name: _____ Date: _____ Period: _____

Covalent Bonding and Mixed Nomenclature Review KEY

Bonding:

- What type of elements (metal, nonmetal, or metalloid) are found in each of the following compounds or bonds
 - Acids **Hydrogen + nonmetal(s) or a poly atomic ion**
 - Covalent compounds **2 nonmentals**
 - Ionic compound **metal + nonmetal (s) or a poly atomic ion**
 - Molecular compounds **2 nonmetals (molecular = covalent))**
 - Polar compound **2 nonmetals with electronegativity difference in between 0.5 to 1.9**
 - Nonpolar compounds **2 nonmetals with electronegativity difference < 0.5**
- What type of bond (single, double, or triple) holds each of the following diatomic molecules together? {HINT DRAW the compound using Lewis structures}
 - Oxygen O₂ **DB**
 - Fluorine F₂ **SB**
 - Chlorine Cl₂ **SB**
 - water **SB**
 - Nitrogen N₂ **TB**
 - Hydrogen H₂ **SB**
 - SO₂ **DB**
 - NH₃ **SB**
- How many lone pairs surround each element in the following diatomic molecules? {HINT DRAW the compound using Lewis structures}
 - Oxygen O₂ **2LP**
 - Fluorine F₂ **3LP**
 - Chlorine Cl₂ **3LP**
 - oxygen in water **2LP**
 - Nitrogen N₂ **1LP**
 - Hydrogen H₂ **0LP**
 - SO₂ **1 for S**
 - nitrogen in NH₃ **1LP**
- Classify each of the following compound as Ionic, Covalent or an Acid
 - CS₂ **covalent – Carbon disulfide**
 - CaSO₄ **ionic -Calcium sulfate**
 - N₂O₄ **covalent**
 - BaI₂ **Ionic -Barium iodide**
 - PCl₃ **covalent – Phosphorus trichloride**
 - VO₃ **ionic**
 - H₃P **acid - Hydro phosphoric acid**
 - H₃PO₃ **acid - phosphorus acid**
 - PCl₅ **covalent**
 - Dinitrogen tetroxide
 - Vanadium (VI) oxide
 - Phosphorus pentachloride
- Classify each of the following as polar or nonpolar covalent bonds. Use electronegativity values in book on page 177.
 - O₂ **nonpolar [EN difference: 3.5-3.5= 0]**
 - HCl **Polar [EN difference: 3.0-2.1 = 0.9]**
 - H₂O **Polar (very) [EN difference: 3.5-2.1 = 1.4]**
 - SO₂ **Polar [EN difference: 3.5-2.5 =1.0]**
 - FCI **Polar [EN difference: 4.0-3.0 = 1.0]**
 - SCl₂ **slightly polar [EN difference: 3.0-2.5 = 0.5]**

Naming

- What covalent prefix corresponds to each of the following numbers
 - One **mono**
 - Two **die**
 - Three **tri**
 - Four **tetra**
 - Five **penta**
 - Six **hexa**
 - Seven **hepta**
 - Eight **octa**
 - Nine **nona**
 - Ten **deca**
- When naming a transition metal ion that can have more than one common ionic charge, the numerical value of the charge is indicated by a **roman number**.
- In naming a binary covalent compound, the number of atoms of each element present in the molecule is indicated by **prefixes**
- Compare and contrast the properties of Covalent and Ionic bonds

	Ionic	Covalent
a. Formed by	Metal and nonmetal or a poly atomic ion	2 nonmetal
b. Electrons	Transferred	Shared
c. Melting point	Very high melting point	Low melting points

d. Most common phase	Solid	Liquid or gas
e. Conductors	Conduct in aqueous or molten solutions.	Do not conduct electricity.

10. For the following items if given the name write the chemical formula and if given the formula write the name. Make sure you follow the correct naming rules.

1. Phosphorous acid H₃PO₃	9. S ₂ F ₆ disulfur hexafluoride
2. Phosphorous pentachloride PCl₅	10. Vanadium (IV) sulfide VS₂
3. Aluminum oxide Al₂O₃	11. HBr hydrobromic acid
4. Fe ₂ (SO ₄) ₃ iron (III) sulfate	12. Calcium sulfate CaSO₄
5. Iron (III) chloride FeCl₃	13. Hydrosulfuric acid H₂S
6. SO ₃ sulfur trioxide	14. Sulfuric acid H₂SO₄
7. AlPO ₄ aluminum phosphate	15. KCl potassium chloride
8. H ₂ SO ₃ sulfurous acid	16. CoO ₂ cobalt (IV) oxide

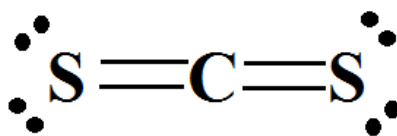
Properties

11. Ionic bonds form by **transferring** electrons, covalent bonds form by **sharing** electrons.
 12. Ionic compound have **high** melting and boiling points while covalent compounds have **low**.

Lewis Structures

13. Draw the Lewis Structure for CS₂, and complete the table below showing number and types of bonds or lone pairs that each element has. [HONORS describe the molecular geometry]

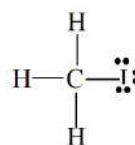
	C	S
Single Bond	0	0
Double Bond	2	1
Triple Bond	0	0
Lone Pair Electrons	0	2



Linear

14. Draw the Lewis Structure for CH₃I, and complete the table below showing number and types of bonds or lone pairs that each element has. [HONORS describe the molecular geometry]

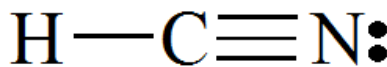
	C	H	I
Single Bond	4	1	1
Double Bond	0	0	0
Triple Bond	0	0	0
Lone Pair Electrons	0	0	3



tetrahedral

15. Draw the Lewis Structure for HCN, and complete the table below showing number and types of bonds or lone pairs that each element has. [HONORS describe the molecular geometry]

	H	C	N
Single Bond	1	1	0
Double Bond	0	0	0
Triple Bond	0	1	1
Lone Pair Electrons	0	0	1



linear