NAME: KEY DATE: _____ PERIOD: A1, A2, B1, B3
A1, A3, B1, B2

UNIT 1C BONDING REVIEW

PART 1: IONIC COMPOUNDS - WRITING FORMULAS AND NAMING COMPOUNDS

1. Use the periodic table to find the number of valence electrons in an atom.

a. Sodium 1 b. Carbon 4 C. Phosphorus 5

2. Draw electron dot formulas of the following representative elements

K· ·Al· ·O: :Cl:

3. State the octet rule. Main-group elements combine in a way that each atom has 8 e⁻s in its outer shell like a noble gas

4. Positive ions are called cation. Negative ions are called anions.

5. Describe the formation of the sodium ion using an electron dot structure.

Na· → [Na]⁺ Sodium transfers its 1 valence e⁻ becoming a +1 cation

6. Describe the formation of the sulfide ion using an electron dot structure.

→ :S: [:S:]²⁻ Sulfur gains 2 e⁻s

7. In an ionic bond, electrons are shared / transferred / connected between atoms. (Circle one)

8. Ionic bonds form between metals and nonmetals. (metals, nonmetals, metalloids)

9. What is a polyatomic ion? An ion made up of 2 or more covalently bonded atoms with an overall charge. i.e. CO_3^{2-} carbonate ion

10. Explain why the compound NaCl is an ionic compound and identify characteristics (properties) of ionic compounds that it would likely have.

Na· → :Cl: Sodium transfers its e⁻ to chlorine which needs 1e⁻ to fill its octet

[Na]⁺ [:Cl:]⁻

- Crystalline Solid - brittle (can be smashed apart)
- High m.p. & b.p.

11. Explain how melted ionic compounds and aqueous solutions of ionic compounds electrical conductivity.
When it is molten or dissolved the ions separate (out of the crystal lattice) the electric current will be able to flow through these charged ions

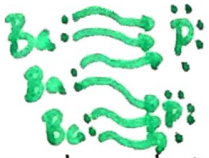
12. How many valence electrons does the element iodine have? What is the formula for iodine's most stable ion?

7 valence electrons so it needs 1 more so I^-

13. Use electron dot formulas to predict the formula of the ionic compound formed when sodium and sulfur combine.

Na· → :S: [Na]⁺ [:S:]²⁻ Na_2S
Na [Na]⁺

14. Using electron dot diagrams, determine the formula of the ionic compound formed when barium and phosphorus combine.



Ba_3P_2

15. How many valence electrons does the element gallium have? What is the formula for galium's most stable ion?

3 Ga^{3+}

16. Write the formula for the ion formed when nitrogen gains electrons to attain a noble gas configuration.

N^{3-}

17. Using electron dot diagrams, show the formation the ionic compound formed when astatine and strontium combine?

$SrAt_2$

18. A "formula unit" is the simplest or lowest ratio of atoms (ions) in an ionic compound.

19. List the oxidation number (charge) and group name for the following groups of elements

Group 1	charge: 1+	Name: Alkali metals
Group 2	charge: 2+	Name: Alkaline earth metals
Group 16 (6A)	charge: 2-	Name: calcinogens / Oxygen fam.
Group 17 (7A)	charge: 1-	Name: halogens

20. Which of the following compounds contains the Sn^{+4} ion?

a. Sn_2Br b. SnCl c. SnI_2 D. SnO_2

21. Name the following compounds. (Some compounds may need a roman numeral)

MgI_2 magnesium iodide

Fe_2O_3 iron (III) oxide

$Al(NO_3)_3$ aluminum nitrate

NH_4Br ammonium bromide

$CuCO_3$ copper (II) carbonate

K_2CO_3 potassium carbonate

Al_2O_3 aluminum oxide

NaCl sodium chloride

22. Write the formula for the following chemical compounds

Copper (I) Oxide Cu_2O

Aluminum nitrate $Al(NO_3)_3$

Potassium chloride KCl

Iron (III) sulfide Fe_2S_3

Calcium hydroxide $Ca(OH)_2$

Calcium Oxide CaO

Aluminum Nitride AlN

Lithium Phosphide Li_3P

23. What is the oxidation number of the unknown element X in the compound MgX_2? -1

Part 2 Molecular Compounds and Covalent Bonding

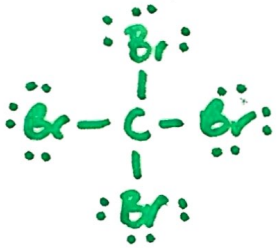
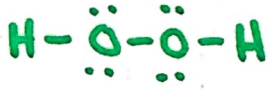
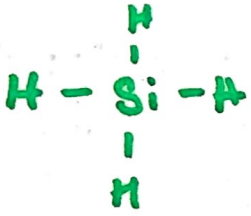
Match the following **compounds** to the three bond types.
Each answer may be used once, more than once, or not at all.

Covalent Bond (nonmetal to non) **Ionic Bond (metal to non)**

1. I KBr
2. C CO_2
3. C CH_4
4. I $CaCl_2$
5. C Br_2
6. I Na_2O
7. C SiO_2
8. I ZnI_2
9. I NaCl
10. C $C_{(graphite)}$
11. C C_3H_8

Molecular Compounds - How Do Atoms Stick Together?

Draw the Lewis Symbols of the following molecules. Only single bonds are used. Name each compound.

Br_2 14e⁻ 	CBr_4 32e 	H_2O_2 14e⁻ 
H_2S 8e⁻ 	PH_3 8e⁻ 	SiH_4 8e⁻ 

Lewis Dots of Molecules

Draw the Lewis Symbols of these molecules that include double and triple bonds. Name each compound.

P_2 	Se_2 	C_2Cl_2 

Properties of Types of Bonds
Match the following **statements** to the two bond types.
Each answer may be used once, more than once, or not at all.

C) Covalent Bond **I) Ionic Bond**

I 1. the strongest bond
I 2. alternating positive and negative particles
C 3. sharing electrons between two atoms
I 4. conducts electricity when dissolved in water
I 5. involves a transfer of electrons
C 6. involved in molecules and in network solids
C 7. does not usually conduct electricity

Organize the compounds below into two columns. One of ionic compounds and one of molecular compounds.

$CaSO_4$ CH_4 CO_2 $BaCl_2$ NH_3 KNO_3 LiOH

Ionic Compounds	Molecular Compounds
$CaSO_4$	CH_4
$BaCl_2$	CO_2
KNO_3	NH_3
LiOH	

Mixed Naming Practice: For each of the following compounds, determine if it is ionic or covalent and name it appropriately.

1. PH_3 C phosphorus trihydride
2. NaBr I sodium bromide
3. CaO I calcium oxide
4. P_2Br_4 C diphosphorus tetrabromide
5. Li_2S I lithium sulfide
6. $Be(OH)_2$ I beryllium hydroxide
7. SO_3 C sulfur trioxide
8. N_2S C dinitrogen monosulfide
9. $MgBr_2$ I magnesium bromide
10. BF_3 C boron trifluoride

Chemical Bonding Worksheet **Date** KEY

Ionic Bond	between a Metal and Non-Metal	(M + NM)
Covalent Bond	between a Non-Metal and Non-Metal	(NM + NM)
Metallic Bond	between a Metal and Metal	(M+ M)

Determine if the elements in the following compounds are metals or non-metals. Describe the type of bonding that occurs in the compound.

Compound	Element 1 (metal or non-metal?)	Element 2 (metal or non-metal?)	Bond Type
NO_2	N = non-metal	O = non-metal	covalent
NaCl	M	N	I
SO_2	N	N	C
PO_4^{3-}	N	N	C
$MgBr_2$	M	N	I
CaO	M	N	I
H_2O	N	N	C
K_2O	M	N	I
Cu-Zn alloy	M	M	M
O_2	N	N	C
$CuCl_2$	M	N	I
NO_2^-	N	N	C
TiO_2	M	N	I
HF	N	N	C
Rb_2S	M	N	I
Au-Ag mixture	M	M	M
Fe_2O_3	M	N	I
$C_6H_{12}O_{22}$	N	N N	C

Name_____ Date_____ Period_____ KEY

Naming Ionic & Covalent Compound

Directions: Identify whether the compound is Ionic or Covalent in the first column. In the second column name the compound accordingly to the correct rules.

Formula	Ionic or Covalent	Name of Compound
1. $Ca(SO_4)$	I	calcium sulfate
2. B_6Si	C	hexaboron monosilicide
3. K_3PO_4	I	potassium phosphate
4. NaCl	I	sodium chloride
5. NaF	I	sodium fluoride
6. CaS	I	calcium sulfide
7. N_2O_3	C	dinitrogen trioxide
8. $SiBr_4$	C	silicon tetrabromide
9. KCN	I	potassium cyanide
10. IP_5	C	iodine pentaphosphide
11. NaOH	I	sodium hydroxide
12. CO_2	C	carbon dioxide
13. $Mg(CO_3)$	I	magnesium carbonate
14. $Al(OH)_3$	I	aluminum hydroxide
15. CH_4	C	carbon tetrahydride (methane)
16. O_2F_2	C	dioxygen difluoride
17. NaCl	I	sodium chloride
18. SF_6	C	sulfur hexafluoride
19. Be(OH)2	I	beryllium hydroxide
20. PCl_3	C	phosphorus trichloride