

Name _____ Period _____

College Prep Chemistry of the Earth

Assignment 5S – Unit 5 Review

40 Points

Answer the following questions, and define the following terms. This assignment can be used on the unit 5A test (includes extra credit on test)

Octet Rule: 8 or 8 val. e^-

Valence electron (e^-)	Lewis Dot Structure

For the following atoms and ions draw their Lewis Dot Structures

Base Atom	K ← 1-3 val. e^- lose, + Al	O 5-7 val. e^- gain - F
Group/Val e^-	1A(1) 1	6A(16) 6
Neutral Lewis Dot Structure	K°	$\begin{array}{c} \circ \circ \circ \\ \circ \end{array}$
Ion Lewis Dot Structure	lose $1e^-$ $[K]^{1+}$	gain $2e^-$ $[\begin{array}{c} \circ \circ \circ \\ \circ \end{array}]^{2-}$

Answer the following questions

Define Ionization Energy	Define Electron Affinity
Define Metallic Bonding	Define Non-Metal Bonding
Define Ionic Bonding	Define Diatomic Element

For each bonding type, list the number of electrons being shared per bond, and draw the structural formula for that bond type (covalent)

Bond Type	Single	Double	Triple
Number of e^- in Bond	2 e^- (1 per atom)	4 e^- (2 e^- per)	6 e^- (3 per)
Structural Formula	$\begin{array}{c} \circ \circ \circ \\ \circ \end{array} \text{X} - \text{X} \begin{array}{c} \circ \circ \circ \\ \circ \end{array}$ (1 line)	$\begin{array}{c} \circ \circ \circ \\ \circ \end{array} \text{X} = \text{X} \begin{array}{c} \circ \circ \circ \\ \circ \end{array}$ (2 line)	$\begin{array}{c} \circ \circ \circ \\ \circ \end{array} \text{X} \equiv \text{X} \begin{array}{c} \circ \circ \circ \\ \circ \end{array}$ (3 lines)

For each central atom, determine the number of unpaired and paired electrons, and the number of single bonds that can occur for each atom.

Base Atom	C	N	S	Br
Lewis Dot Structure				
Paired / Unpaired e ⁻		1 pair 3 unpaired		
Total Number Single Bonds		3 single		

For the following structural formulas identify the number of each bond type, and unpaired electrons around the central atom.

Covalent Bond	CBr ₄	CH ₂ O	OF ₂
Structural Formula			
Number of Bonds	3 single 0 double	2 single 1 double	
Single/Double Triple/Unpair	0 triple 1 unpair	0 triple 1 unpair	
Symmetrical or NonSym	Non-Symm. X	Non-Symm	Symmetrical

For the following atom pairs, calculate electronegativity difference, and determine bond type

Bond	K - S	Al - Cl	H - O	F - F
Electroneg.	(metal) 0.8 2.5		2.1 3.5	
Electroneg. Difference	2.5 - 0.8 = 1.7		3.5 - 2.1 = 1.4 (no metals)	
Bond Type*	Ionic	ED > 0.5 → Polar	Polar	

Ionic (ED > 1.9 or w/metal, Polar (ED < 1.9, > 0.5, no metal), Non-Polar (ED < 0.5)

For each bonding type, determine the type of interaction, draw a picture or the interaction, then determine the strength of interaction

Bond Type	Ionic Bond	Polar Bond	Non-Polar Bond
Type of Interaction	.		
Structural Formula			

Bond Strength: Strong, Medium, Weak

Type Int: Trans. / Unequal Share / Equal Share

For the following covalent molecules, determine the name or formula

Formula	F_2 <i>single atom type</i>	OCl_2	NH_3 <i>1 ← 3</i>	CO_2
Name	<u>Fluorine</u>	Oxygen dichloride	Nitrogen trihydride	Carbon dioxide

Formula	Br_2	PH_3	SF_2	HCl
Name	(Bris diatomic) Bromine <i>single element</i>	Phosphorous Trihydride	<i>no prefix (1)</i> Sulfur Difluoride <i>(2)</i>	Hydrogen Monochloride

Answer the following questions

Hydrate	Dehydration

For the following states of matter determine the shape and volume

State of Matter			
Shape*			
Volume*			

*Fixed of Variable

For the following state changes, determine the name of the state change, and the energy of state change (Heat of ____), and sign of heat change

State Change	$s \rightarrow l$	$l \rightarrow s$	$l \rightarrow g$	$g \rightarrow l$
State Change Name	reg. g	lose g	reg. g	lose g
State Change Energy Name				
Heat Sign (+ or -)	(endo) $q = +$ kJ	(exo) $q = -$ kJ	(endo) $q = +$ kJ	(exo) $q = -$ kJ

Define the following terms

Pure Substance (Single) Mixture (Two or More)

Solvent	Solute	Solution

Define the following terms

Homogenous Solution	Heterogenous Mixture
Soluble	Insoluble

Data Tables and Charts

Group Number	1A 1	2A 2	1B – 10B	3A 13	4A 14	5A 15	6A 16	7A 17	8A 18
Valance Electrons (e^-)	1	2	2	3	4	5	6	7	8
Lewis Dot Structure	X•	•X•	•X•	•X•	•X•	•X•	:X:	:X:	:X:

Covalent Nomenclature

Number	1	2	3	4	5	6	7	8	9	10
Prefix	mono	di	tri	tetra	penta	hexa	hepta	octa	nona	deca

Naming Format	A_xB_y	Prefix X Element A Prefix Y Element B -ide (<i>ion chart</i>)
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Electronegativity Difference and Table

Ionic – ED > 1.9	Polar – ED 0.5 – 1.9	Non-Polar – ED < 0.5
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H 2.1																	He ---
Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	Ne ---
Na 0.9	Mg 1.2											Al 1.5	Si 1.8	P 2.2	S 2.5	Cl 3.0	Ar ---
K 0.8	Ca 1.0	Sc 1.3	Ti 1.5	V 1.6	Cr 1.6	Mn 1.5	Fe 1.8	Co 1.8	Ni 1.8	Cu 1.9	Zn 1.6	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	Kr 3.0
Rb 0.8	Sr 1.0	Y 1.2	Zr 1.4	Nb 1.6	Mo 1.8	Tc 1.9	Ru 2.2	Rh 2.2	Pd 2.2	Ag 1.9	Cd 1.7	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	Xe 2.6
Cs 0.7	Ba 0.9	La-Lu 1.1-1.2	Hf 1.3	Ta 1.5	W 1.7	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Tl 1.8	Pb 1.8	Bi 1.9	Po 2.0	At 2.2	Rn ---
Fr 0.7	Ra 0.9	Ac-No 1.1-1.7															