Key

Unit 3 Test Review: Matter, Bonding, & Nomenclature

- Matter

- Physical and Chemical Properties and Changes

1. Determine if the following are physical properties/changes or chemical properties/changes.
   a. Melting point P
   b. Ability of rust C
   c. Density P
   d. Transparency P
   e. Glass breaking P
   f. A rusting bicycle C
   g. Frying an egg C
   h. Squeezing oranges for juice P
   i. Mixing salt and water P
   j. Cutting the grass P
   k. Fireworks exploding C
   l. Boiling water P

- Kinetic Molecular Theory and States of Matter

2. What are the 4 states of matter and how are they different from each other in terms of…

	solid	liquid	gas	plasma
a. Particles	very close together	close together	far apart	very far apart
b. Movement	vibrate in position	slide past each other	random	random
c. Speed of particles	very slow ←		→	very fast
d. Kinetic energy	low ←		→	high

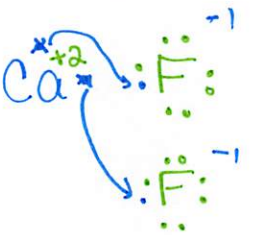
Bonding

3. Ionic Bonds
   e. Occurs between a metal & a nonmetal
   f. When electrons (e^-) are transferred from metal to nonmetal
   g. Ionic compound properties
      1. solid crystals
      2. high melting & boiling points
      3. conduct electricity when molten or dissolved in solution

h. Electron Dot Diagrams

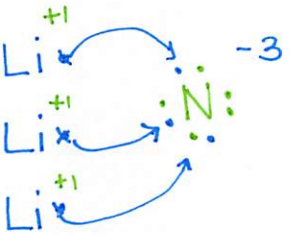
You must show the e⁻ getting transferred, the charges, & the formula of the resulting compound

1. Ca & F



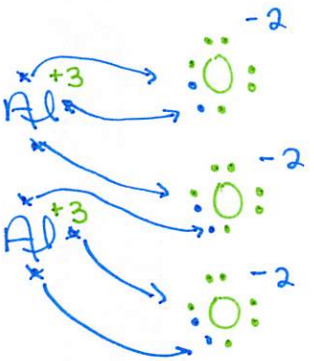
CaF_2

2. Li & N



Li_3N

3. Al & O



Al_2O_3

4. Covalent Bonds

a. Occurs between 2 nonmetals or & a metalloid & a nonmetal

b. When electrons (e^-) are shared

c. Covalent Compound Properties

1. solids, liquids, or gases
2. low melting & boiling points
3. insulators (nonconductors)

5. Lewis Structures: Show how valence e⁻ are shared between two atoms.

a. CCl_4

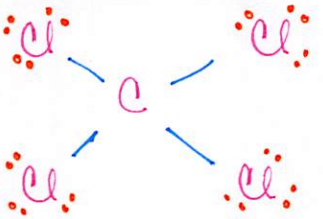
1(4e) + 4(7e)

4e⁻ + 28e⁻

32e⁻/2 = 16 prs

-4 b. prs

12 Lone prs

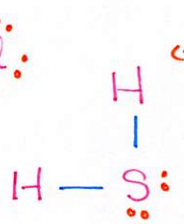


b. H_2S

2(1e) + 1(6e)

2e⁻ + 6e⁻

8e⁻/2 = 4 prs - 2 b. prs = 2 Lone prs



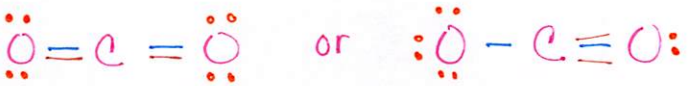
H's never get Lone pairs of e⁻

c. CO_2

1(4e) + 2(6e)

4e + 12e

16e⁻/2 = 8 prs - 2 b. prs = 6 Lone prs



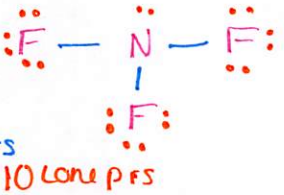
d. NF_3

1(5e) + 3(7e)

5e + 21e⁻

26e/2 = 13 prs - 3 b. prs

= 10 Lone prs



e. OF_2

1(6e) + 2(7e)

6e + 14e

20e/2 = 10 prs - 2 b. prs = 8 Lone prs

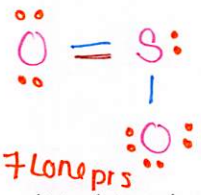
f. SO_2

1(6e) + 2(6e)

6e + 12e

18e/2 = 9 prs

-2 b. prs = 7 Lone prs



6. Use the periodic table with electronegativities on it to determine if the following bonds are ionic (greater than 1.6), polar covalent (between .5 and 1.6), or pure covalent (less than .5).

a. H – C 2.5 − 2.1 = .4 pure covalent

b. Al – O 3.5 − 1.5 = 2.0 ionic

c. N – P 3.0 − 2.1 = .9 polar covalent

d. O - F 4.0 − 3.5 = .5 polar covalent

e. Ge - S 2.5 − 1.8 = .7 polar covalent

7. Intermolecular Forces (IMFs)

a. What are the 3 types of IMFs? Describe each in terms of what they are and their strength compared to each other.

weakest
London dispersion force
LDFs are temporary attraction caused by clustering e⁻ on one side of the molecule

medium
dipole-dipole forces
attraction b/w the positive & negative sides of 2 dipoles-
has lone pairs on center atom

strongest
Hydrogen bonding
attraction b/w a hydrogen on one molecule & a nitrogen, oxygen, or fluorine on another

b. How are IMFs different than intramolecular bonds, such as ionic and covalent bonds? IMFs are between molecules while intramolecular bonds are between atoms inside a molecule

Nomenclature

How do you know what type of compound it is?

Type I Binary Regular metal + nonmetal	**Type II Binary** Transition metal + nonmetal Name has Roman Numerals	**Type III** 2 nonmetals Name uses prefixes	**Binary Acid** Hydrogen + anion NO Oxygen Name has hydro------ic acid
Type I Tertiary Regular metal + polyatomic ion	**Type II Tertiary** Regular metal + polyatomic ion Name has Roman Numerals		**Oxyacid** Hydrogen + polyatomic ion with Oxygen Name is ------ic acid or ------ous acid

8. NOMENCLATURE - MIXED REVIEW

1. carbon tetrachloride CCl_4
2. mercury(II) oxide HgO
3. potassium chlorate $KClO_3$
4. hydrobromic acid HBr
5. sodium hydroxide $NaOH$
6. copper(I) dichromate $Cu_2Cr_2O_7$
7. boron trifluoride BF_3
8. phosphorous acid H_3PO_3
9. aluminum sulfate $Al_2(SO_4)_3$
10. copper(II) nitrate $Cu(NO_3)_2$
11. sodium phosphate Na_3PO_4
12. mercury(II) nitrate $Hg(NO_3)_2$
13. aluminum hydroxide $Al(OH)_3$
14. sulfuric acid H_2SO_4
15. lead (II) carbonate $PbCO_3$
16. sodium chromate Na_2CrO_4
17. silicon dioxide SiO_2
18. barium chloride $BaCl_2$
19. nickel(II) phosphate $Ni_3(PO_4)_2$
20. copper(I) acetate $CuC_2H_3O_2$
21. chlorous acid $HClO_2$
22. iodine pentafluoride IF_5
23. tin(IV) sulfate $Sn(SO_4)_2$
24. chromium(II) oxide CrO
25. lithium iodide LiI
26. $CaCO_3$ calcium carbonate
27. Li_2S lithium sulfide
28. HI hydroiodic acid
29. $Tl(NO_3)_3$ thallium nitrate
30. NH_4NO_3 ammonium nitrate
31. $Cu(ClO_4)_2$ copper (II) perchlorate
32. H_3PO_4 phosphoric acid
33. S_2O_5 disulfur pentoxide
34. $Rb_2Cr_2O_7$ rubidium dichromate
35. KMnO4 potassium permanganate
36. $Cu(NO_3)_2$ copper (II) nitrate
37. $Ni(OH)_2$ nickel (II) hydroxide
38. $XeCl_2$ xenon dichloride
39. $(NH_4)_2SO_4$ ammonium sulfate
40. $PbCl_2$ lead (II) chloride
41. HCN hydrocyanic acid
42. $Fe_3(PO_4)_2$ iron (II) phosphate
43. $AgNO_3$ silver (I) nitrate
44. $HClO_3$ chloric acid
45. N_2O_5 dinitrogen pentoxide
46. $AlCl_3$ aluminum chloride
47. $TiCl_4$ titanium (IV) chloride
48. $Cr_2(SO_3)_3$ chromium (III) sulfite
49. KOH potassium hydroxide
50. CBr_4 carbon tetrabromide