Name:_____

Blk:_____Date:_____

Chemistry 11
ELECTRONEGATIVITY + COVALENT BONDING

ELECTRONEGATIVITY- _____

_____.

The following exercises are intended to help you get a better understanding of what trends in electronegativity occur in the periodic table:

Example 1. Use the atoms Na and Cl for the following questions:

a. Which atom has a larger atomic radius?_____
b. Which atom has the stronger attraction to the outer electrons on a a neighbouring atom, based only on the atomic radius?_____
c. Which atom has the greater nuclear charge?_____
d. Which atom can attract electrons from an adjacent atom most strongly, based on both size and nuclear charge?
e. Summarize the above by completing this statement:

IN GENERAL, when going from LEFT to RIGHT across the periodic table the electronegativity of the atoms will _____.

Example 2. Compare Br and At

a. Which atom has a larger atomic radius? _____
b. Which atom has a stronger attraction to the outer electrons of another atom?
c. Summarize the above by filling in the statement below:

IN GENERAL, when going DOWN a family of the periodic table, the electronegativity of the atoms will _____.

Example 3.

a. Ignoring the NOBLE GASES, which atom is the most ELECTRONEGATIVE?
b. Ignoring the NOBLE GASES, which atom is the least ELECTRONEGATIVE?
c. Which is more electronegative: Cs or Be?
d. Which is more electronegative: Sn or F?

TABLE OF ELECTRONEGATIVITIES:

H 2.2																
Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 3.9
Na 0.9	Mg 1.2											Al 1.5	Si 1.8	P 2.1	S 2.4	Cl 3.0
K 0.9	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 1.7	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.7
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 1.5	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.2
Cs 0.7	Ba 0.9	La-Lu 1.1	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 1.4	Tl 1.8	Pb 1.9	Bi 1.9	Po 2.0	At 2.2
Fr 0.7	Ra 0.9															

Source: L. Pauling, The Nature of the Chemical Bond and the Structure of Molecules and Crystals, Cornell University Press, Ithica, New York, 1960. **Used by permission of the publisher.**

You can use the table of electronegativities and the following formula predict BOND TYPES:

Δ EN = Greater EN value – Smaller EN value

3.3----------1.7----------0.5----------0.0

There are three possible outcomes:
1. Δ EN is between 0.0 and 0.5 = _____BOND
2. Δ EN is between 0.5 and 1.7 = _____BOND
3. Δ EN is between 1.7 and 3.3 = _____BOND

IN GENERAL, compounds with a Δ EN value ≥ 1.7 is _____ while a Δ EN value < 1.7 is _____.

Example 4. Use the above formula to predict the bond type for the following compounds:
a. HCl =
b. H_2O =
c. Cl_2 =
d. NH_3 =

COVALENT BONDING:_____
_____.

A covalent bond is formed when two atoms having less than full shells of electrons are able to share one or more of their electrons with each other in order to attain full electron shells.

OCTET RULE: _____
_____.

Example 5. The Lewis Dot Structures below show how fluorine atoms gain an octet of valence electrons when forming fluorine gas:

IN GENERAL, covalent bonds are formed when a _____ combines with another _____!!!!!