Name ANSWERS Date_____ Period_____

Polarity & Electronegativity Worksheet

1. What does it mean to say a bond is polar?

   There is an unequal sharing of e^- in the bond

2. How are ionic bonds and covalent bonds different?

   ionic bonds result from gaining + losing e^- to form ions
   covalent bonds " " sharing of e^- to become stable

3. How does a polar covalent bond differ from a non-polar covalent bond?

   Polar covalent (0.4–1.7) creates a permanent pole ($\delta^+ \rightarrow \delta^-$)
   whereas non-polar (0.1–0.4) does not (δ^+ δ^-)

4. How do electronegativity values help us determine the type of bond created?

   pure | non-polar | polar | ionic
   0 δ^+ δ^- 0.4 $\delta^+ \rightarrow \delta^-$ 1.7 $[]^+[]^-$ 3.3

5. For each of the following molecules, determine if it is covalent, polar, or ionic. **Show your work by listing the electronegativities of each element in the bond.**

Molecule	Electronegativity Values	Difference in Electronegativity	Bond Type
H – Cl	H: 2.2 Cl: 3.16	0.96	polar covalent
H – H	H: 2.2 H: 2.2	0	pure covalent
H - I	H: 2.2 I: 2.66	0.46	polar
Cl - Cl	Cl: 3.16 Cl: 3.16	0	pure
C – O	C: 2.55 O: 3.44	0.89	polar
Ca – O	Ca: 1.0 O: 3.44	2.44	ionic
H_2O	H: 2.2 O: 3.44	1.24	polar
Al – Fe	Al: 1.61 Fe: 1.83	0.22	metallic ☺

6. For each of the following sets of elements, identify the element expected to be most electronegative (EN) and which is expected to be least **electronegative (EN).**

   a. K, Sc, Ca most EN= Sc least EN= K

   b. Br, F, At most EN= F least EN= At

   c. C, O, N most EN= O least EN= C

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7. Complete the following table.

Bond		Δ EN	Type of Bond (ionic, pc, np, pure)	Diagram (show partial charges ar dipole moments if applicable)
C -- O	O C	3.44 2.55 0.89	pc	$\delta^+ C \xrightarrow{+} O^{\delta-}$
S -- Cl	Cl S	3.16 2.58 0.58	pc	$\delta^- Cl \xleftarrow{+} S^{\delta+}$
P -- I	I P	2.66 2.19 0.47	pc	$\delta^- I \xleftarrow{+} P^{\delta+}$
F -- I	F I	3.98 2.66 1.32	pc	$\delta^- F \xleftarrow{+} I^{\delta+}$
N -- O	O N	3.44 3.04 0.40	pc	$\delta^+ N \xrightarrow{+} O^{\delta-}$
P -- Br	Br P	2.96 2.19 0.77	pc	$\delta^- Br \xleftarrow{+} P^{\delta+}$
C -- I	I C	2.66 2.55 0.11	np	$\delta^- I - C^{\delta+}$
H -- O	O H	3.55 2.20 1.35	pc	$\delta^+ H \xrightarrow{+} O^{\delta-}$
N -- Cl	Cl N	3.16 3.04 0.12	np	$\delta^- Cl - N^{\delta+}$
O -- I	O I	3.44 2.66 0.78	pc	$\delta^- O \xleftarrow{+} I^{\delta+}$