

Atoms, Molecules and Chemical Bonds Assignment

1. Complete the table. Assume neutral atoms.

name	Chlorine			
symbol		N		
atomic #				15
# protons			18	
# neutrons				
# electrons				
# electrons in 1st shell				
# electrons in 2nd shell				
# electrons in 3rd shell				
# valence electrons				

2. Draw **Bohr diagrams** for the atoms below.

- a) nitrogen b) argon c) phosphorus

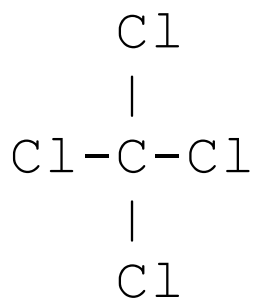
3. Draw **Lewis dot diagrams** for the atoms below.

- a) argon b) phosphorus c) beryllium

4. Draw the **Lewis illustration of ionic bond formation** for **Aluminum Phosphide**. Use 3 steps as done in class.

5. For the following molecules, draw **partial charges ("deltas")** over the appropriate atoms and then state in the blank whether the molecule as a whole is **polar or non-polar**.

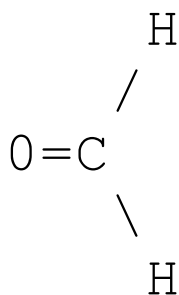
a)



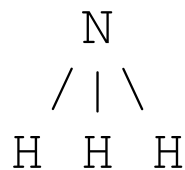
b)



c)



d)



6. a) Consider a molecule with 2 carbon atoms joined by a single bond. How many **hydrogen atoms** does the molecule need so that each carbon has a **complete octet**? _____
- b) Make a **sketch of the molecule** showing all atoms and bonds.

- c) Make a **sketch of a molecule** which contains the atoms listed below. Make sure that each atom has the correct number of bonds. There is no single correct answer.

5 C, 3 N, 2 O, 1 Cl, and as many H as needed

7. **Polar or charged** substances dissolve well in water (a polar liquid). Indicate whether each of the following will or will not **dissolve well** in water by writing "Yes" or "No".

- | | | | |
|---------------------|-------|-------------------|-------|
| a) H ₂ O | _____ | d) glucose | _____ |
| b) Na ⁺ | _____ | e) O ₂ | _____ |
| c) H-H | _____ | f) HCl | _____ |

8. "One hundred human volunteers were involved in clinical trials of a new acne medicine. Fifty individuals took 80 mg of AcneGone with 500 mL of water, twice a day; the other fifty individuals drank 500 mL of water, twice a day. Ninety-five percent of individuals taking AcneGone experienced a noticeable decrease in acne. However, two percent of individuals taking water only experienced a noticeable decrease in acne."

Identify the:

- a) **independent** variable _____
- b) **dependent** variable _____
- c) **controlled** variable(s) _____

How would you explain the fact that two percent of individuals taking **water only** experienced a decrease in acne?
