**Electron Configurations and Bond Formation Name:**

**Advanced Chemistry Block:**

*Complete the table below, then answer the questions that follow.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group #** | **Group name** | **# of valence electrons** | **Electron configuration of valence orbital ONLY** | **Ion formation** | **Electron configuration of ion** |
| I | Alkali metals | 1 | (n) s1 | (1+) cation  Na 🡪 Na+ + 1e- |  |
| II |  |  |  |  |  |
| III | --- |  |  |  |  |
| IV | --- |  |  |  |  |
| V | --- |  |  |  |  |
| VI | --- |  |  |  |  |
| VII |  |  |  |  |  |
| VIII |  |  |  |  |  |

1. Explain how you can use the periodic table to predict the formula of ionic compounds.
2. If you have a bond between a metal atom and a nonmetal atom, which of the two is more electronegative? Explain why.
3. Sulfur forms both Na2S and SF2. Is sulfur the most electronegative element in both compounds? Why or why not?
4. Why do you think the noble gases do not have electronegativity values?
5. Which is generally larger than the parent atom – cations or anions? Explain.
6. Write the proper charges so that an alkali metal, a noble gas, and a halogen have the same electron configurations. These species make up an isoelectric (same number of electrons) series.

Alkali Metal: Noble Gas: Halogen:

Answer the following:

* 1. What is the number of protons in each species?

Alkali Metal: Noble Gas: Halogen:

* 1. What is the number of electrons in each species?

Alkali Metal: Noble Gas: Halogen:

* 1. How many filled energy levels do each have?

Alkali Metal: Noble Gas: Halogen:

* 1. Arrange the species from lowest to highest ionization energy.

Alkali Metal: Noble Gas: Halogen:

* 1. Arrange the species from smallest to largest radius.

Alkali Metal: Noble Gas: Halogen:

1. Using only the periodic table, predict the most stable ion for Na, Mg, Al, S, Cl, K, Ca, and Ga.