**CONCEPT:** PERIODIC TABLE: MAIN GROUP ELEMENT CHARGES

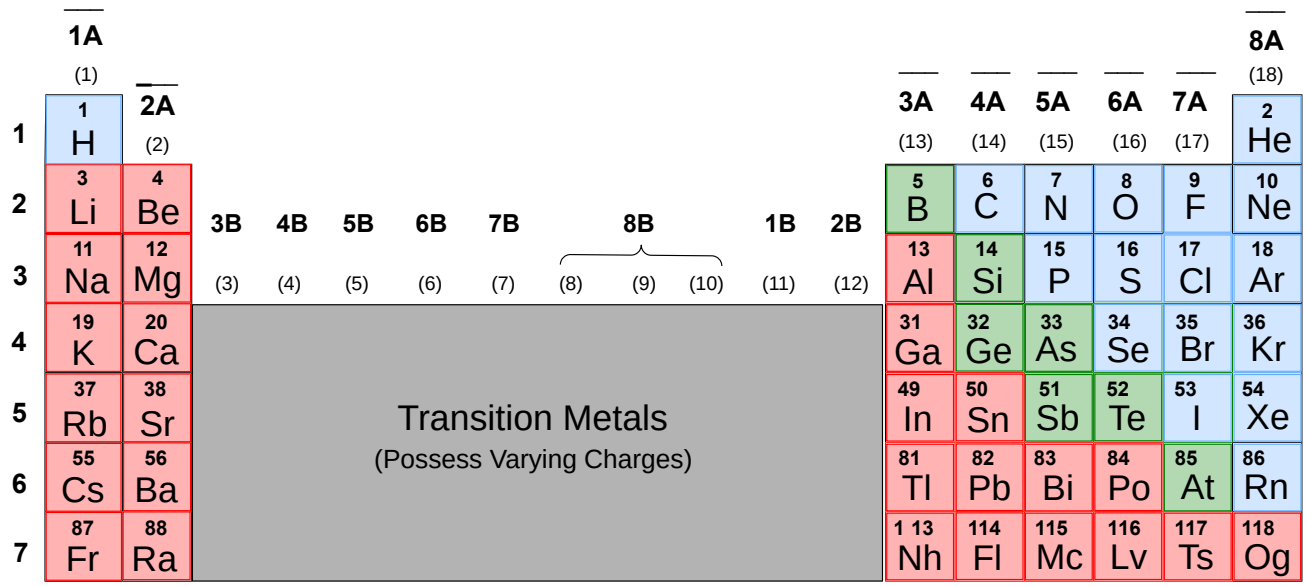
- Elements lose or gain electrons to be like the noble gases, which have the optimal number of outer shell electrons.
  - □ **Metals**: tend to _____ electrons to become positively charged ions called *cations.*
    - □ Metals that have _____ charge are referred to as *Type I* Metals.
    - □ Metals that have _____ charge are referred to as *Type II* Metals.
  - □ **Non-metals**: tend to _____ electrons to become negatively charged ions called *anions.*

**EXAMPLE:** From what you know about ion formation and the Periodic Table, which ion would be unlikely to occur?

a) $Rb^{+}$ b) $O^{2-}$ c) $Mn^{5+}$ d) $Al^{3-}$ e) $Cl^{-}$

**Main Group Elements**

- Recall, that the atomic number of an element equals the number of protons within its nucleus.
  - □ For a neutral element, its number of electrons is equal to the number of protons.
  - □ EXCEPTION 1**:** Main Group Metals of Lead (Pb) and Tin (Sn), which can be _____ or _____.
  - □ EXCEPTION 2**:** The heavy metals of Bismuth (Bi), Polonium (Po) and Z = 114 to 118 have variable charges.




- □ The first _____ elements in Groups 4A and 5A don't form ions because too much energy is needed.

**EXAMPLE:** Predict the charge that a gallium ion would possess.

a) +1 b) +2 c) +3 d) -1 e) -2