

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

## 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.

	1A												8A									
	(1)	2A											(18)									
1	1 H	(2)											3A	4A	5A	6A	7A	2 He				
													(13)	(14)	(15)	(16)	(17)					
2	3 Li	4 Be	3B	4B	5B	6B	7B	8B			1B	2B	5 B	6 C	7 N	8 O	9 F	10 Ne				
3	11 Na	12 Mg	(3)	(4)	(5)	(6)	(7)	(8) (9) (10)			(11)	(12)	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar				
4	19 K	20 Ca	Transition Metals (Possess Varying Charges)										31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
5	37 Rb	38 Sr											49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
6	55 Cs	56 Ba											81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn				
7	87 Fr	88 Ra											113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og				

- ☐ 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