### **Type 2: Representative Elements**

- 1. Outermost shell is incompletely filled.
- 2. Excluding 18<sup>th</sup> group, remaining 'S' & 'P' block elements (IA, IIA, IIIA, IVA, VA,
- VI A, VII A) are called as representative elements.
- 3. Most of these elements are abundant and active.
- 4. Outer electronic configuration ns<sup>-1</sup> np<sup>1-5</sup>
- 5. Metals, Non-metals and metalloids are present.

#### **Type 3: Transition Element**

1. In these elements the ultimate and penultimate shells are incompletely filled.

2. Elements which have incomplete or partially filled 'd' orbital are called as transition elements.

3. General electronic configuration is (n-1)d<sup>1-9</sup> ns<sup>0-2</sup>

4. They exhibits some special properties like variable oxidation states, form coloured ions, from alloys and etc. e.co.uk

#### **Type 4: Inner Transition Elements:**

#### filled n, (n-1) & (n-2) 1. In these elements, 3 outermost shells

- 2. The f-block elements are called in the transition elements.
- 3. General configuration ¹ (n-1)⁰/
- 4. They are placed separately at the pottom of periodic table
- 5. Mon of them are radio ctice elements

4f series  $\rightarrow$  lanthanoids 5f series  $\rightarrow$  actinoids

## 13. Classification: Metals, Non-metals and Metalloids

Metals	Metalloids	Non – Metals
Comprise 78% of known	Some elements like	Located at top right
elements	silicon, germanium,	hand side of periodic
	arsenic, antimony,	table.
	tellurium.	
Present at left side of	Bordering this line and	Usually solids or gases at
periodic table(usually)	running diagonally	room temperature.
	across periodic table	
Usually solid at room	Show properties of both	With low melting and
temperature (except	metals and non- metals	boiling points. (except
mercury)	called as metalloids	carbon and boron)

## b) <u>Ionic Radius</u>:

- It is the distance between the nucleus and the electron in the outer most shell of its ion.
- Removal of electrons from atom → cation
  Gain of electrons from atom → anion
- In cation → size is smaller than parent atom because it has fewer electrons, while nuclear charge remains constant.
- In anion → size is larger than parent atom, due to addition of electrons, results in increase in repulsion among electrons and decrease in nuclear charge.

K<sup>3</sup>B: Isoelectric Species :

- Species having same number of e<sup>-</sup>.
- In isoelectric species, the size increases with increase of negative charge & decreases with increase in positive charge.
  Ex: C<sup>-</sup> > N<sup>-3</sup> > O<sup>-2</sup> > F<sup>-</sup> > Ne > Na<sup>+</sup> > Mg<sup>+2</sup> > Al<sup>+2</sup> > Si<sup>+4</sup>

Q6)Considering the atomic number and reason the periodic table, arrange the following elements in the increasing brain of metallic character : Si, Be, Mg, Na, P. Ans: Metallic character increases then a group and decreases along a period as we move from left to right. Heree the order of increasing metallic character is:

> Q7)Identify isoelectronic species a)  $Mg^{+2} \& Al^{+3} c$ )  $N^{-3} \& C^{-5}$ b)  $Al^{+2} \& Mg^{+2+} d$ )  $N^{-3} \& C^{-4}$ Answer:- (a) & (d) are isoelectronic species. Reason (a)  $Mg^{+2} \rightarrow$  atomic number of Mg = 12No. of electron =  $12 - 2 = 10 e^{-1}$   $Al^{+3} \rightarrow$  atomic number of Al = 13No. of electron =  $13 - 3 = 10 e^{-1}$ (d)  $N^{-3} \rightarrow$  atomic number of N = 7No. of electron =  $7 - (-3) = 10 e^{-1}$   $C^{-4} \rightarrow$  atomic number of C = 6No. of electron =  $6 - (-4) = 10 e^{-1}$

# 15.(i)Valency:

- Valency of an element is the number of H atoms (or) double the no. of oxygen atoms that can combine with one atom of that element.
- It is equal to the number of electrons in the outermost orbitals or equal to 8 – the number of outermost e<sup>-</sup>.
- More than one valency then it is called as **variable** valencies.
- Highest valency shown by **Os**, **Ru**, **Xe**.

# (ii)Covalency:

• The number of covalent bonds formed by an element. Ex: in **NH**<sub>3</sub>, covalency of **'N'** is 3.

Q12)Predict the formula of component formed b/w an element X of group 13 & Y of group 16. Notesale.co.uk

Answer:- valency of X (grp 13) = 3 valency of Y (grp 16) = 8 - 6 = 2

compound  $\rightarrow$  X

pounds which might be formed Q13)Using the Periodic and bromine (b) aluminium and sulphur. by the following Solution:

(a) Silicon is group 14 element with a valence of 4; bromine belongs to the halogen family with a valence of 1. Hence the formula of the compound formed would be SiBr<sub>4</sub>. (b) Aluminium belongs to group 13 with a valence of 3; sulphur belongs to group 16 elements with a valence of 2. Hence, the formula of the compound formed would be  $AI_2 S_3$ .

## (iii)Oxidation State:

- The positive charge with which an atom appears in a compound is called oxidation state.
- It can be +ve, -ve (or) zero

Q14)What is the oxidation number of nitrogen peroxide?? Answer:-  $N_2O_5 \rightarrow 2x + 5(-2) = 0$  $\rightarrow 2x = 10 \rightarrow x = 5$