

## The d- and f- block elements.

### d-block transition elements

- Gr. 3-12
- 4 periods each having 10 elements
- 3d series (Sc to Zn) 1st Transition
- 4d series (Y to Cd) 2nd Transition
- 5d series (La to Hg, omitting Ce to Lu) 3rd Transition
- 6d series (Ac - still on discovery) 4th Transition

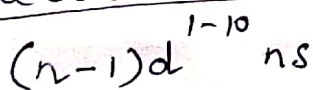
### f-block inner-transition elements.

- 2 series each having 14 elements.
- Basically a part of group 3
- 1st series follow Lanthanum La (d-orbitals) called Lanthanoids.
- 2nd series follow Actinium Ac (d-orbitals) called Actinoids.

### 1.1) Transition elements - (Position of d-orbital)

- Element which has incompletely filled d-orbitals in its ground state or in any of its oxidation states.
- There is a change from metallic character of s-block elements to non-metallic character of p-block elements.

### 1.2) Electronic Configuration of d-block Elements.



#### Exceptions.

- Palladium (Pd) is an atom has no electron in s-subshell.
- In the case of Cr and Cu in 3d series:-  
EC:  $3d^5 4s^1$  (stable)  $3d^4 4s^2$  (Cr)  
EC:  $3d^{10} 4s^1$  (stable)  $3d^9 4s^2$  (Cu)

Since half and completely filled sets of orbitals are relatively more stable.

c) Zn, Cd, Hg have  $(n-1)d^{10}ns^2$  have completely filled in the ground state as well as their oxidation states. So, they are not regarded as transition elements. Since the properties of the d-block elements are quite different from those of s and p block elements in which the filling occurs either in s or in p-orbitals, both belonging to valence shell.