D-Block Elements: Introduction.

A transition element may be defined as an element whose atom in the ground state or ion in common oxidation state has incomplete sub-shell, has electron 1 to 9. It is called transition element due to fact that it is lying between most electropositive (s-block) and most electronegative (p-block) elements and represent a transition from them. The general electronic configuration of these element is $(n-1)^{1\text{ to }10}\ ns^{0\text{ to }2}$.

The definition of transition metal excludes Zn, Cd and Hg because they have complete d-orbital. Their common oxidation state is $Zn^{++}, Cd^{++}, Hg^{++}$. They also do not show the characteristics of transition element. Zn, Cd, Hg are called non-typical transition element. Some exceptional electronic configuration of transition element are : $Cr = 3d^5\ 4s^1$, $Nb = 4d^4\ 5s^1$, $Pb = 4d^{10}\ 5s^0$, $Ag = 4d^{10}\ 5s^1$, $Cu = 3d^{10}\ 4s^1$, $Mo = 4d^5\ 5s^1$, $Ru = 4d^7\ 5s^1$, $Pt = 5d^0\ 6s^1$, $Au = 5d^{10}\ 6s^1$. These irregularities can be explain on the basis of half-filled and full filled stability of d-orbital.

Classification: Transition element are classified in following series:

(1) First transition series (3d) $= 21$ to 30 i.e. Sc to Zn.

(2) Second transition series $(4d) = 39$ to 48 i.e. Y to Cd.

(3) Third transition series $(5d) = 57\ La$ and 72 – 80 Hf to Hg.

(4) Fourth transition series or 6d series $= 89\ Ac$ and 104 – 112 Rf.

So there are 39 transition element at present in the periodic table.

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H		Transition Elements ← (d-block elements) →										13	14	15	16	17	He
		3	4	5	6	7	8	9	10	11	12						
s-block elements		21 *Sc*	22 *Ti*	23 *V*	24 *Cr*	25 *Mn*	26 *Fe*	27 *Co*	28 *Ni*	29 *Cu*	30 *Zn*	p-block elements					
		39 *Y*	40 *Zr*	41 *Nb*	42 *Mo*	43 *Tc*	44 *Ru*	45 *Rh*	46 *Pd*	47 *Ag*	48 *Cd*						
		* 57 *La*	72 Hf	73 *Ta*	74 *W*	75 *Re*	76 *Os*	77 *Ir*	78 *Pt*	79 *Au*	80 *Hg*						
		* 69	104	105	106	107	108	109	110								
			58-71 Lanthanide series (Lanthanides)														
			90-103 Actinide series (actinides)														