

**SSLC -Chemistry -Class -06**

**Periodic Table and Electronic Configuration**

**Peculiarity of the electronic configuration of chromium (Cr) and copper (Cu)**

The expected subshell electronic configuration of Cr is  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4 4s^2$ .

But the stable electronic configuration of Cr is  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$ . Because the configurations with half filled d subshell or completely filled d subshell show greater stability.

The expected subshell electronic configuration of Cu is  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$ .

But the stable electronic configuration of Cu is  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$ . Because the configurations with half filled d subshell or completely filled d subshell show greater stability.

**Subshell electronic configuration and blocks**

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s-block												p-block					
1												13	14	15	16	17	18
H	2	d-block										B	C	N	O	F	He
Li	Be											Al	Si	P	S	Cl	Ne
Na	Mg	3	4	5	6	7	8	9	10	11	12	Ga	Ge	As	Se	Br	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	In	Sn	Sb	Te	I	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	Tl	Pb	Bi	Po	At	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Pb	Bi	Po	At	Rn	
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
		f-block															
		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

Elements are classified into four blocks s, p, d and f in the modern periodic table.

## s Block

In the periodic table, elements in groups 1 & 2 belong to s block.

Eg  $\text{Li} : 1s^2 2s^1$   
 $\text{Mg} : 1s^2 2s^2 2p^6 3s^2$

## p Block

In the periodic table, elements in groups 13 to 18 belong to the p block.

Eg  $\text{Al} : 1s^2 2s^2 2p^6 3s^2 3p^1$   
 $\text{Ar} : 1s^2 2s^2 2p^6 3s^2 3p^6$

The period and the group can be found out on the basis of

The period number is same as the shell number of the outer most shell in the subshell electronic configuration.

**Eg :      Al :  $1s^2 2s^2 2p^6 3s^2 3p^1$    Period : 3**

For s block elements the number of electrons in the outermost s subshell will be the group number.

The group number of the d block elements will be the same as the sum of electrons in the outermost s subshell and the number of electrons in the preceding d subshell.

**Eg :      K :  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$  ,   Group - 1**

**Ar :  $1s^2 2s^2 2p^6 3s^2 3p^6$    Group - 18**

### Questions

**A. Write the subshell electronic configuration of Chlorine, ( $_{17}\text{Cl}$ ) ?**

**1 ) Find out the Block, Period and Group of this element ?**

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**B. The subshell electronic configuration of an element ends with  $3d^4$ . Answer the following questions.**

- 1. Write the complete subshell electronic configuration?**
- 2. Find out the Atomic number ?**
- 3. Identify the block ?**
- 4. Write the group number , and period number ?**

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