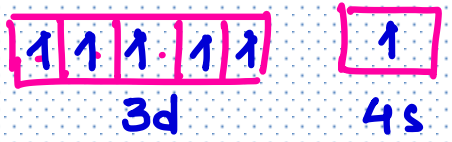
SOME IMPORTANT DEFINITIONS

• Cr (24)

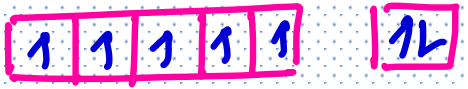
↳ $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^5, 4s^1$



$n = 6$

$\mu = \sqrt{6(6+2)} = \sqrt{48}$ B.M.

Mn (25) = $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^5, 4s^2$



$n = 5$

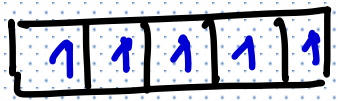
$\mu = \sqrt{5(5+2)} = \sqrt{35}$ B.M.

SOME IMPORTANT DEFINITIONS

Fe^{+3}

$Fe\ (26) = [Ar].\ 3d^6\ 4s^2$

$Fe^{+3} = [Ar].\ 3d^5\ 4s^0$



$n = 5$

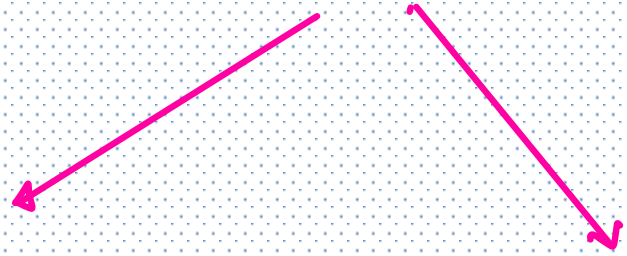
$\mu = \sqrt{5(5+2)}$ B.M

$= \sqrt{35}$ B.M.

Mole Concept

SOME IMPORTANT DEFINITIONS

shortcut



μ

1. 1.732 B.M
2. 2.81
3. 3.90
4. 4.92
5. 5.91
6. 6.89

unpaired electron.

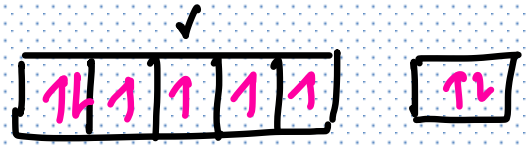
1
2
3
4
5
6

SOME IMPORTANT DEFINITIONS

Ex. if. Fe^{+x} has $\mu = 4.92$ B.M then find value of x and No of unpaired electrons?

① No of unpaired electrons. = 4

Fe (26) → [Ar]. $3d^6, 4s^2$



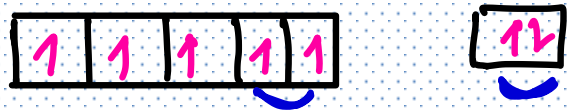
x = 0,	n = 4
x = +2	n = 4
x = +4	n = 4

SOME IMPORTANT DEFINITIONS

Ex. The magnetic momentic moment of Mn^{+x} is 3.89 B.M find no of unpaired electrons and value of x.

Soln No of unpaired electrons = 3

$Mn(25) = [Ar], 3d^5, 4s^2$



total electron must be removed to get 3 unpaired electrons = 4

Mn^{+4} , $x = +4$

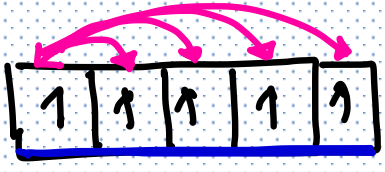
SOME IMPORTANT DEFINITIONS

- Reason / Explanation for exceptional electronic configuration

- Half filled and fully filled orbitals are more stable than partially filled orbital

d^4

partially filled



d^5

Hay filled

d^{10}

fully filled

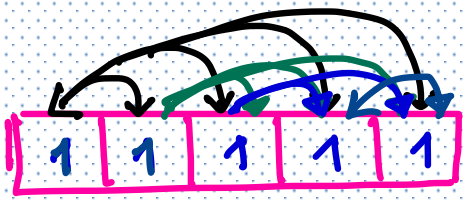
- Half fulled and full filled stablised due to exange of electrons with same spin electron.

SOME IMPORTANT DEFINITIONS

- Each exchange releases some amount of energy called exchange energy.
- Stability $\propto$ Exchange energy
- Exchange energy $\propto$ No of exchange.
- No of exchange: $= \frac{n(n-1)}{2}$

n is No of electrons having same spin

SOME IMPORTANT DEFINITIONS



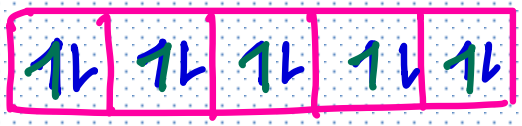
d_5

$4+3+2+1=10$

$= \frac{n(n-1)}{2}$

$= \frac{5(5-1)}{2} = 10$

d_{10}



Exchange by (↑) $= \frac{5(5-1)}{2} = 10$

Exchange by (↓) $= \frac{5(5-1)}{2} = 10$

SOME IMPORTANT DEFINITIONS

Exceptions.

	n=1	n=2		n=3			n=4				n=5				n=6
Element Z	**1s**	**2s**	**2p**	**3s**	**3p**	**3d**	**4s**	**4p**	**4d**	**4f**	**5s**	**5p**	**5d**	**5f**	**6s**
Chromium(Cr-24)	2	2	6	2	6	5	1								
Copper(Cu -29)	2	2	6	2	6	10	1								
Niobium(Nb-41)	2	2	6	2	6	10	2	6	4		1				
Molybdenum(Mo-42)	2	2	6	2	6	10	2	6	5		1				
Ruthenium(Ru -44)	2	2	6	2	6	10	2	6	7		1				
Rhodium(Rh -45)	2	2	6	2	6	10	2	6	8		1				
Palladium(Pd -46)	2	2	6	2	6	10	2	6	10						
Silver(Ag -47)	2	2	6	2	6	10	2	6	10		1				
Lanthanum(La -57)	2	2	6	2	6	10	2	6	10		2	6	1		1
Cerium(Ce -58)	2	2	6	2	6	10	2	6	10	1	2	6	1		2
Gadolinium(Gd -64)	2	2	6	2	6	10	2	6	10	7	2	6	1		2
Platinum(Pt -78)	2	2	6	2	6	10	2	6	10	14	2	6	9		1
Gold (Au-79)	2	2	6	2	6	10	2	6	10	14	2	6	10		1

SOME IMPORTANT DEFINITIONS

Ex. Find the maximum and minimum No of electrons in Cr having $s = +\frac{1}{2}$

$Cr = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^5, 4s^1$

Either $(+\frac{1}{2})$ or $(-\frac{1}{2})$

$(+\frac{1}{2})$ 9 $(-\frac{1}{2})$ 9

max. = 9 + 6 = 15

min = 9 + 0 = 9

SOME IMPORTANT DEFINITIONS

HW → Each question Either example or Excise in module.

BB-4

Race-4

Race-5

partice sheet-02

practice sheet 03

ATOMIC STRUCTURE

RULES FOR FILLING OF ELECTRONS

Cr^{+} :

(a) $Cr \rightarrow 1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^1, 3d^5$

↓

Valence shell

(b) $Cr^{+} \rightarrow 1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^5$

$Cr^{+2} \rightarrow 1s^2, 2s^2 2p^6 3s^2 3p^6 3d^4$

$Cr^{+3} \rightarrow 1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^3$

Fe^{+2} : $Fe \rightarrow 1s^2, 2s^2 2p^6, 3s^2 3p^6 4s^2 3d^6$

$Fe^{+2} \rightarrow 1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^6$

SOME IMPORTANT DEFINITIONS

÷ Doubt ÷

6.4 × 1000 = 6400 gm

Illustration 5. A sample of $K_2SO_4.Al_2(SO_4)_3.24\,H_2O$ contains 6.4 kg oxygen then calculate mass of sulphur (in gm) in same sample ?

$\frac{6.4}{16}$ = (0.4 k mol)

Solution. $K_2SO_4.Al_2(SO_4)_3.24H_2O$

6.4 kg oxygen

[moles of substance × 40] number of oxygen

$40 \times x \times 16 = 6400$ gram

$x = 10$ moles

number of moles of s = 4×10 moles = 40 moles

weight of sulphur = 1280 gm

( ) : S : O

4 : 40

x : 0.4 kmol

$\frac{4}{x} = \frac{40}{0.4}$

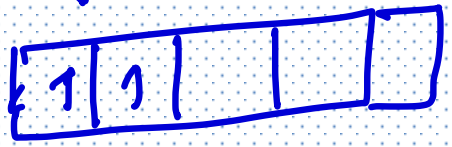
$x = 0.04$ kmol

Mass = 0.04 × 32 = 1.28 kg

SOME IMPORTANT DEFINITIONS

- $V(23) = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^3, 4s^2$

$V^{+3} = [Ar], 3d^2, 4s^0$



$n = 2$

$\mu = \sqrt{2(2+2)}$ B.M

$= \sqrt{8}$ B.M

SOME IMPORTANT DEFINITIONS

Cu (29) → [Ar], $3d^{10}$, $4s^1$

21 upload
R-4
R-5
P_sheet

$C = 1s^2, 2s^2, 2p^2$ (G.S)

$C^* = 1s^2, 2s^1, 2p^3$ (E.S)

we must give energy.

↑	↑	↑

↑

$C^* \Rightarrow$ | ↑↓ |

$S = n(\pm\frac{1}{2})$

$= 3(\pm\frac{1}{2}) = \pm 3/2$

spin multiplicity $= 2|S|+1 \Rightarrow$

SOME IMPORTANT DEFINITIONS

K, L, G,
2 8 M

$1s^2$ $2s^2$ $3s^2$
$2p^6$ $3p^4$

Mole Concept

SOME IMPORTANT DEFINITIONS