$K_4[Co(CN)_6]$

↳ Strong ligand

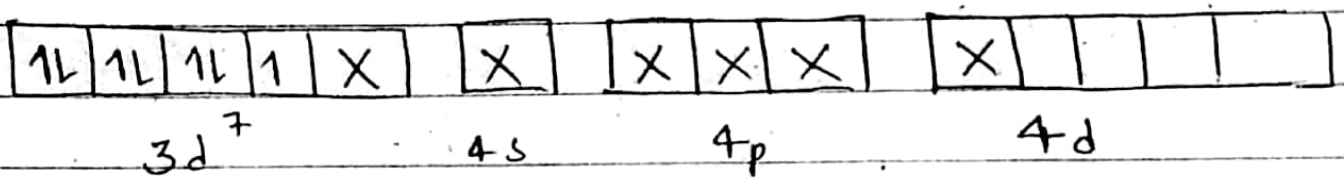
$4 + x - 6 = 0$

$x = 2$

$Co = [Ar], 3d^7, 4s^2$

28

$Co^{+2} = [Ar], 3d^7, 4s, 4p, 4d$



⇒ Para magnetic due to presence of unpaired e^-.

⇒ $3d^7$ - coloured compound.

⇒ d^2sp^3

⇒ Octahedral

⇒ C.No = 6

⇒ Magnetic moment = $\sqrt{n(n+2)}$ BM

$= \sqrt{1(1+2}$ BM

$= \sqrt{3}$ BM

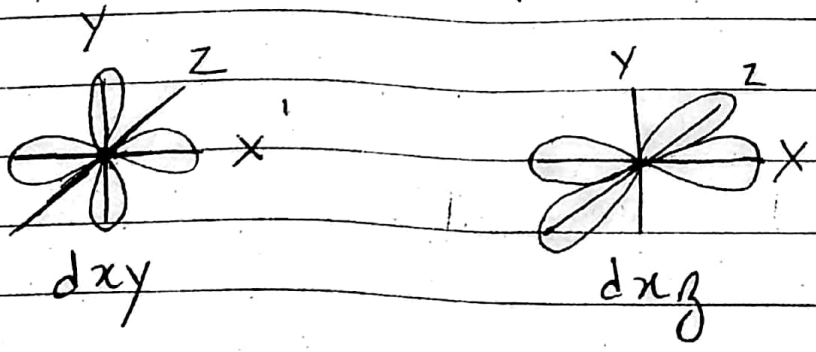
Splitting Of d-orbital in Octahedral field ⇒

When ligand approach towards d-orbital then split into two set of orbital one in eg and other in t_{2g}.

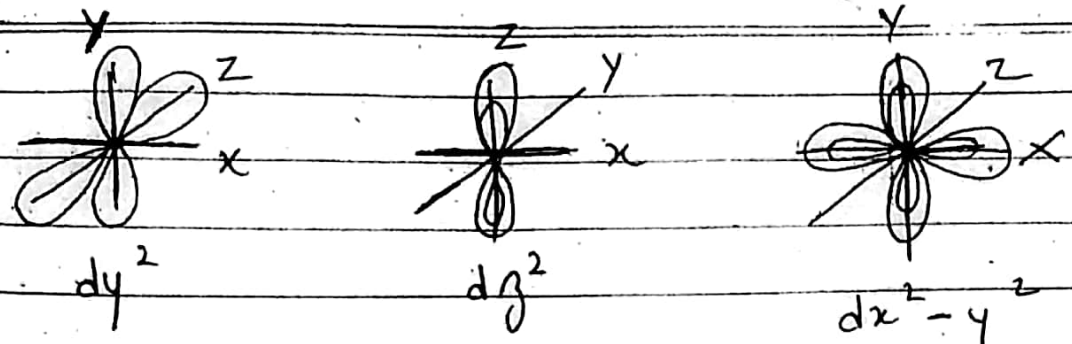
⇒ eg - set of Orbital -
e- means double degenerate (having same energy and different Wave function)
eg → dz^2, dx^2-y^2

⇒ g - means gerade =
Having centre of inversion i.e - centre which divide molecules and compound into two identical form.

⇒ t_2g - set of orbital -
t_2 means triple degenerate (orbital having same energy and different Wave function.
eg → dxy, dxz, dyz.



dxy dxz



eg → $K_4[Fe(Cl)_6]$

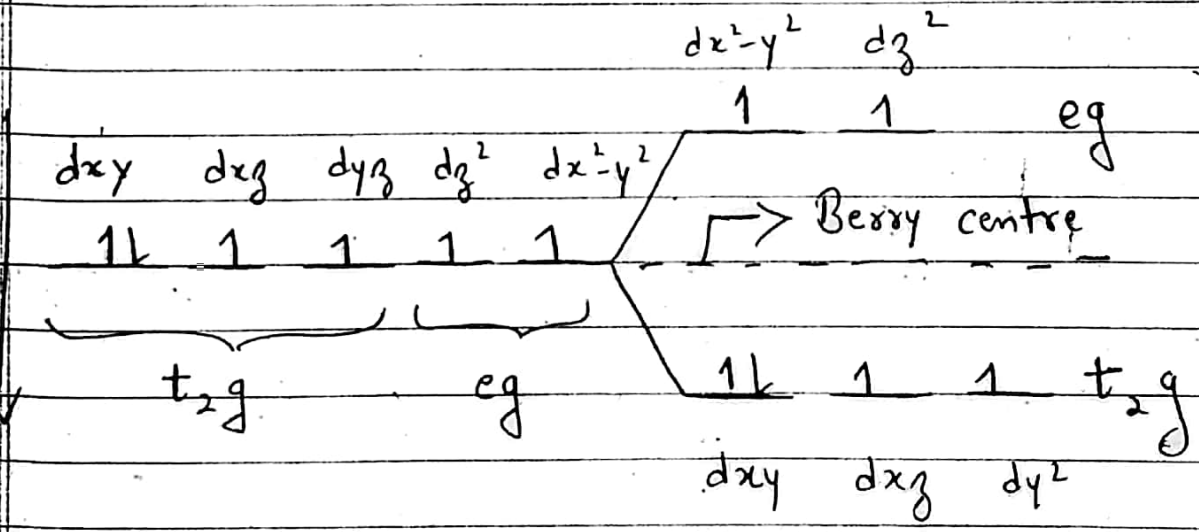
$4 + x - 6 = 0$

$x = 2$

$_{26}Fe = [Ar]\, 3d^6, 4s^2$

$Fe^{2+} = [Ar], 3d^6$

↑↓	1	1	1	1
d_{xy}	d_{xz}	d_{yz}	d_{z^2}	$d_{x^2-y^2}$



In octahedral Splitting eg- set of orbitals having more energy hence migrate in upward from barry centre while t_{2g} set of orbitals having less energy hence move downward from berry centre.

Teacher Signature