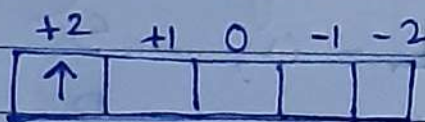


# ORGEEL Diagram:- (Octahedral System)

$d^1$  :-



Total angular momentum Quantum.  $L = 2$

Total Spin Quantum No.  $(S) = \frac{1}{2}$

$L = 0, S$

$L = 1, P$

$L = 2, D$

$L = 3, F$

$L = 2, D$  State

$$2S + 1 = 2 \times \frac{1}{2} + 1 = 2$$

$S \rightarrow A_{1g}$

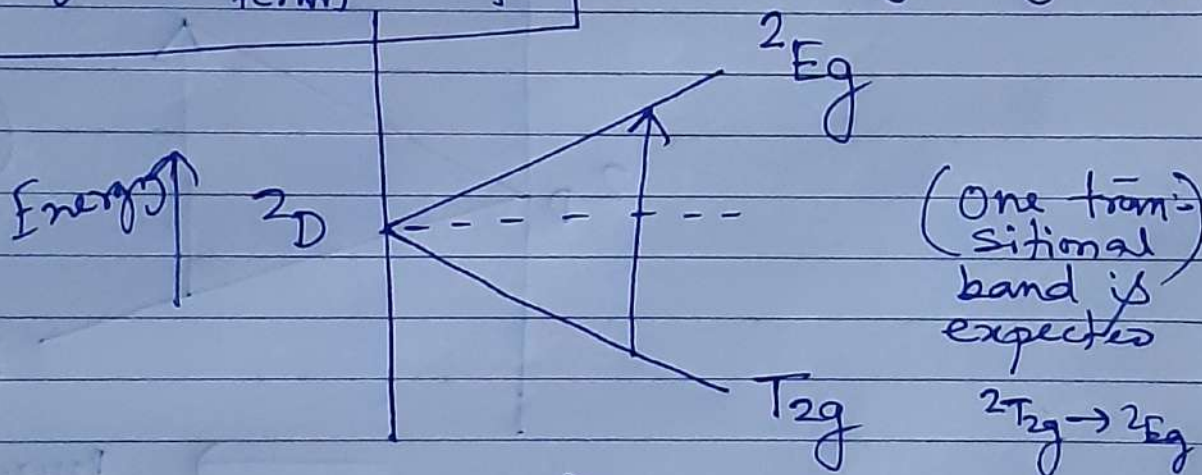
$P \rightarrow T_{1g}$

$D \rightarrow E_g, T_{2g}$

$F \rightarrow A_{2g}, T_{2g}, T_{1g}$

$S, P, D, F \rightarrow$  Term Symbol in free ions

$A_{1g}, T_{2g}, T_{1g} \rightarrow$  Spectroscopic term



Increasing ligand field

Ground State  $\rightarrow T_{2g}$

First excited State  $\rightarrow E_g$

For octahedral system

Home tasks:- ( $d^2 \rightarrow d^9$ ) octahedral high spin case. Draw the ORGEEL diagram.

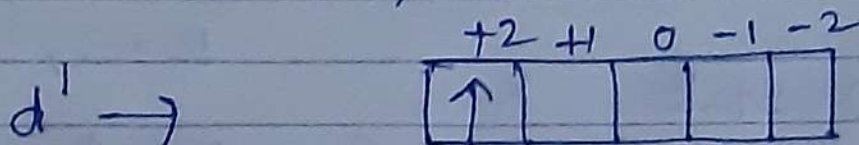
# ORTEL diagram (Tetrahedral System)

$$L=0, \quad S \longrightarrow A_1$$

$$L=1, \quad P \longrightarrow T_1$$

$$L=2, \quad D \longrightarrow E, T_2$$

$$L=3, \quad F \longrightarrow A_2, T_2, T_1$$

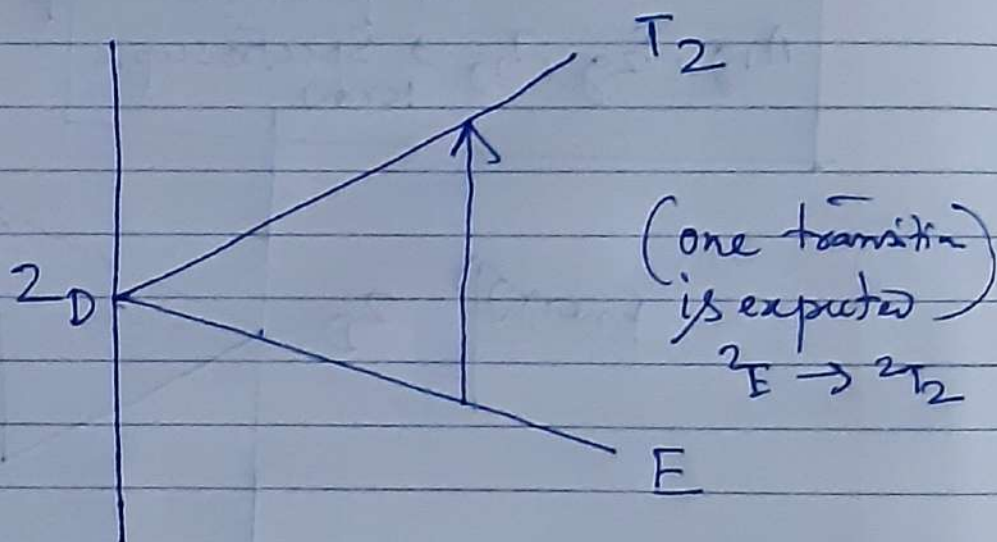


$$L=2$$

$$S = \frac{1}{2}$$

$$2S+1=2$$

Ground State Term  
 $2D$



Ground State  $\longrightarrow E$   $\longrightarrow$  Increasing ligand field

First excited state  $\longrightarrow T_2$

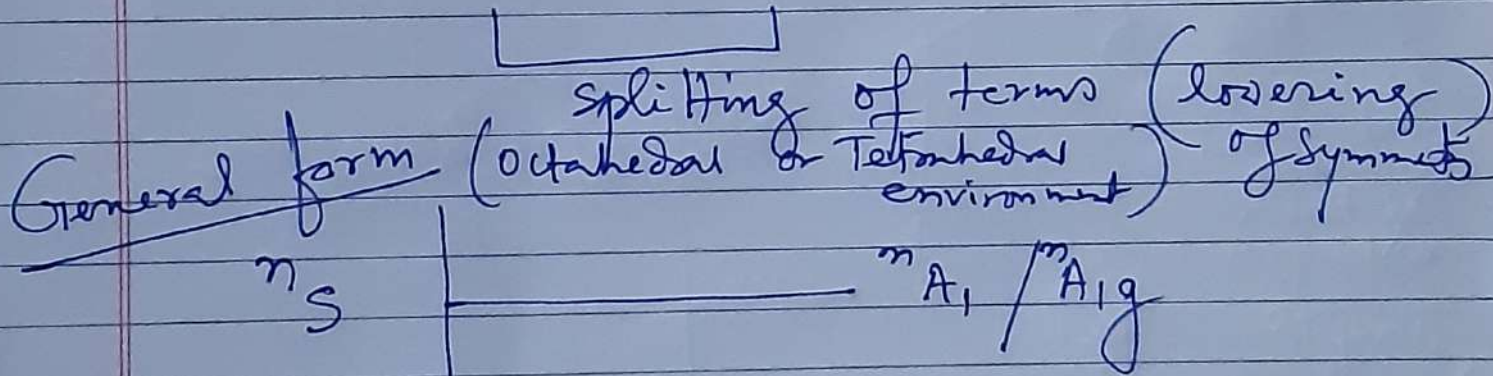
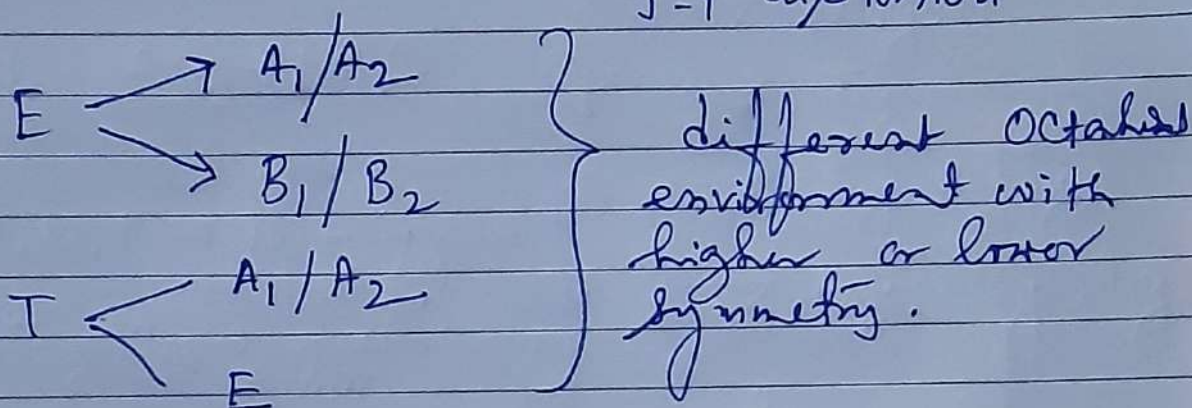
Home tasks :- (ORTEL diagram  $d^2 - d^9$  Tetrahedral system.)

$A_1, B_1, A_2, B_2 \rightarrow$  Non degenerate term

$E \rightarrow$  Doubly degenerate

$T \rightarrow$  Triply degenerate

$A_1, B_1, A_2, B_2 \rightarrow$  Remain same or unaffected by ligand field / or J-T distortion



$\rightarrow$  Increasing ligand field