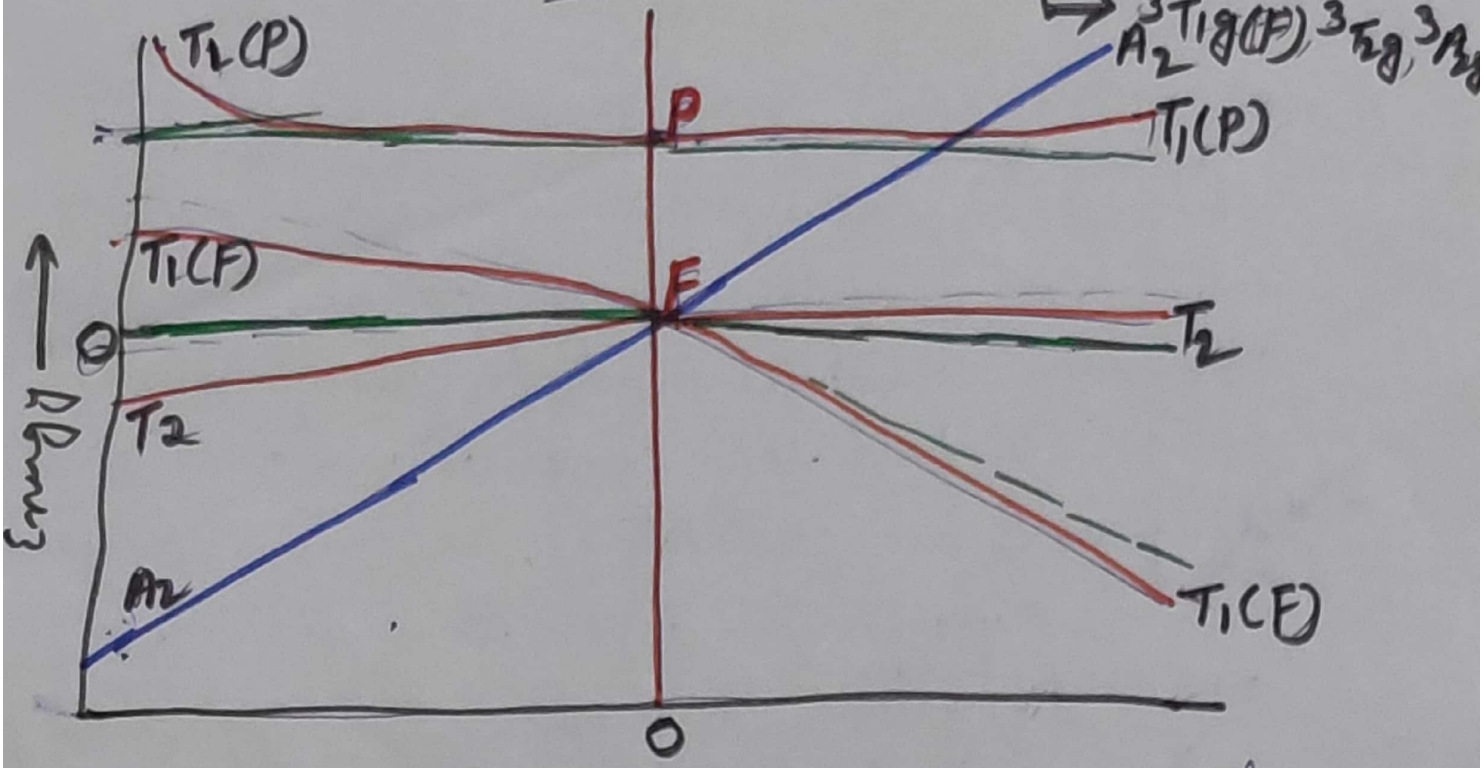
(2)

Energy Term

$d^2, d^8 \rightarrow {}^3F, {}^3P \rightarrow T_{1g}(P)$

$\hookrightarrow {}^3A_2 T_{1g}(F), {}^3T_{2g}, {}^3A_{2g}$



d^2, d^7 tetrahedral ← Dq → d^2, d^7 octahedral

d^3, d^8 octahedral. d^3, d^8 tetrahedral

Orgel diagram for various configuration

1) In this orgel diagram energy is represented by X axis and the vertical line in the centre of the diagram represents the gaseous ion where there is no ligand field $\Delta = 0$

2) In presence of octahedral ligand field the free ion term of d^2 configuration F split in to T_1, T_2 and A_2 and P split up in to $T_1(P)$.

3) The lines of $T_{1g}(F)$ and $T_{1g}(P)$ states curve away each other due to quantum mechanical non crossing rule. Thus, the term of same symmetry will never cross and repel each other.

4) In orgel diagram of octahedral complex term g is used because it is symmetrical but in tetrahedral complex we can not use g because it is unsymmetrical.

5) In orgel diagram of d^1, d^6 octahedral and d^4, d^9 tetrahedral only one transition.

$$T_2 - E$$

d^1, d^6 tetrahedral & d^4, d^9 octahedral one transition

$$E \rightarrow T_2.$$

6) In orgel diagram of d^2, d^7 octahedral. and $d^3 d^8$ tetrahedral Three transition.

RHS
- $T_1(F) \rightarrow T_2$
- $T_1(F) \rightarrow A_2$
- $T_1(F) \rightarrow T_1(P)$

LHS
- $A_2 \rightarrow T_2$
- $A_2 - T_1(F)$
- $A_2 \rightarrow T_1(P)$