

Hund's Rules to Determine the Ground State Term

Inner closed shells and subshells produce $M_L = \sum m_l = 0$, i.e. \vec{L} must be zero.

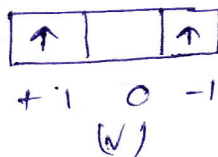
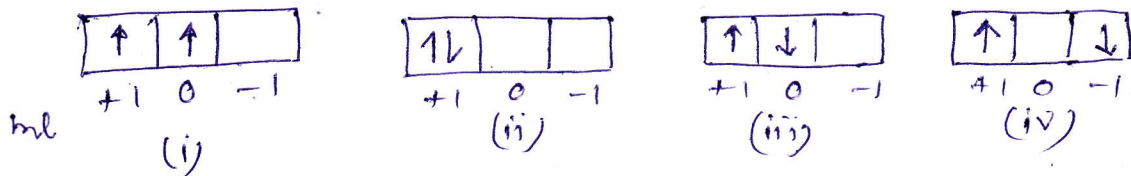
Similarly $M_S = \sum m_s = 0$, i.e. \vec{S} must be zero.

This is why they contribute nothing to the vectors obtained from the unfilled shells (valence shell). Thus the term symbols appear only from the valence shell. To determine the ground microstate of an atom, Hund's rules are extremely important and these are formulated as follows

① Hund's first rule is the rule of Spin multiplicity:

Ground state will be determined by the highest spin multiplicity $(2S+1)$. or

If a number of degenerate energy levels are available then the electrons will try to remain unpaired with parallel spins as long as possible.



only (i) and (v) are allowed.

(ii) Hund's second rule is the rule of orbital multiplicity:

After considering the highest spin multiplicity the ground term will be determined by the highest possible orbital multiplicity $(2L+1)$; i.e. the highest L value