Examples of Hund's Rules

Z	Atom	Config	Allowed S	Allowed L	Term $^{2S+1}L_j$	
1	H	$(1s)^1$	½	0	$^2S_{½}$	(l=0 for s electron)
2	He	$(1s)^2$	0	0	$^1S_0$	(Hund's Rule zero)
3	Li	$(1s)^2(2s)^1$	½	0	$^2S_{½}$	
4	Be	$(1s)^2(2s)^2$	0	0	$^1S_0$	(Hund's Rule zero)
5	B	$(1s)^2(2s)^2(2p)^1$	½	1	$^2P_{½}$	(l=1 for p electron)
6	C	$(1s)^2(2s)^2(2p)^2$	0,1*	0, 1*, 2	$^3P_0$	(Pauli exclusion applies)
7	N	$(1s)^2(2s)^2(2p)^3$	½, 3/2*	0**, 1, 2, 3	$^4S_{3/2}$	(Pauli exclusion applies).

* the correct value, state with the right symmetry

** Adding of three electrons. Need to look at the symmetry of all l values (Hard)
But an easy formula is final $l = \sum m_l$

More Examples of Hund's Rules

Z	Atom	Config	Allowed S	Allowed L	Term $^{2S+1}L_J$
7	N	$(1s)^2(2s)^2(2p)^3$	½, 3/2	0, 1, 2, 3	$^4S_{3/2}$
8	O	$(1s)^2(2s)^2(2p)^4$	0,1	0,1*,2	$^3P_2$
9	F	$(1s)^2(2s)^2(2p)^5$	½	1	$^2P_{3/2}$
10	Ne	$(1s)^2(2s)^2(2p)^6$	0	0	$^1S_0$
11	Na	$(Ne)(3s)^1$	½	0	$^2S_{½}$
12	Mg	$(Ne)(3s)^2$	0*,1	0	$^1S_0$
13	Al	$(Ne)(3s)^2(3p)^1$	½	1	$^2P_{½}$
14	Si	$(Ne)(3s)^2(3p)^2$	0,1*	0,1*,2	$^3P_0$

79 out of 103 elements have atomic moments as free atoms/ions

Only unpaired electrons in unfilled (usually outermost) shells have a moment.