Term symbols for d^2 configuration (Ground state)

There 45 arrangement in which two d-electrons may be arranged which do not violate Pauli's exclusion principle. However, these arrangements can be represented by only five states —

^1S, ^3P, ^1d, ^3f, ^1g

Let's try ——

(1) Maximum value of $M_s = 1$ & M_L associated with it, $M_L = 3$, this corresponds to $L = 3$ & state multiplicity $(2S+1) = 3$

So, it is ^3f. If $L = 3$ then $M_L = +3, +2, +1, 0, -1, -2, -3$

and if $S=1$ the M_s may have values $M_s = +1, 0, -1$

Thus —

21 combinations of M_L & M_s values —

$M_L = +3$	$M_s = +1, 0, -1$
$M_L = +2$	$M_s = +1, 0, -1$
$M_L = +1$	$M_s = +1, 0, -1$
$M_L = 0$	$M_s = +1, 0, -1$
$M_L = -1$	$M_s = +1, 0, -1$
$M_L = -2$	$M_s = +1, 0, -1$
$M_L = -3$	$M_s = +1, 0, -1$

21 of allowed values assigned 3f term symbol.