

2. For a given quantum number l there are $(2l + 1)$ different values of m_l . For each given m_l the electron can also have two different spin orientations. Thus, the total number of electron states for a given l is given by $N_l = 2(2l + 1)$.

(a) Now $l = 3$, so $N_l = 2(2 \times 3 + 1) = 14$.

(b) In this case, $l = 1$, which means $N_l = 2(2 \times 1 + 1) = 6$.

(c) Here $l = 1$, so $N_l = 2(2 \times 1 + 1) = 6$.

(d) Now $l = 0$, so $N_l = 2(2 \times 0 + 1) = 2$.