7-9 (quantum numbers)

For hydrogen atom with $n=3$

a) $\ell = 2$ b) $m = -2, -1, 0, 1, 2.$

$\ell = 1$ $m = -1, 0, 1.$

$\ell = 0$ $m = 0$

c) Since $m_s = \pm 1/2$, there will be $9 \times 2 = \boxed{18}$ possible states. Generally: $\boxed{\#\text{states} = 2n^2}$