**ENERGY LEVEL DIAGRAMS**

**You are expected to use the Pauli exclusion principle, Hund’s rule, and the aufbau principle to write electron configurations for a variety of elements in the periodic table.**

The principal quantum number, n, describes the energy of the electron, ∴ the energy level of that electron. Within each energy level, there are sub-levels of energy in that each type of orbital (s, p, d, etc.) has a different energy associated with it. When the orbitals are placed in order of increasing energy, they provide the order in which electrons fill them for a ground state atom. This order can be determined using the following diagram:

|  |  |
| --- | --- |
| 1s  2s 2p  3s 3p 3d  4s 4p 4d 4f  5s 5p 5d 5f 5g | Draw diagonal lines from top right to bottom left to determine the order. (p.188)  1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p, 5s … |

Use the following rules to fill in the energy level diagram:

1. Aufbau principle – each electron is added to the lowest energy orbital available in an atom or ion
2. Pauli exclusion principle – only two electrons with opposite spins can occupy any one orbital
3. Hund’s rule – one electron occupies each of several orbitals at the same energy before a second electron can occupy the same orbital

Each box in the diagram represents one orbital. Each orbital can have 0, 1, or 2e−. Draw arrows, ↑↓, to represent the electrons with opposite spins in the orbitals.