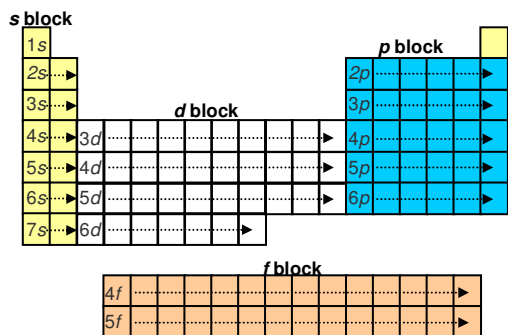
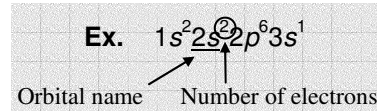


Electron Configuration

Chem Worksheet 5-6

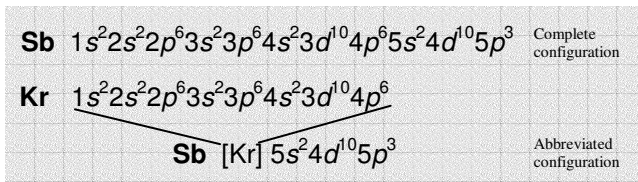
Name _____

An **electron configuration** is simply a list of the orbitals that contain electrons for a given element. The orbital designation is followed by a superscript number that tells how many electrons are found in that orbital. The following designation represents an atom with electrons found in the $1s$, the $2s$, the $2p$, and the $3s$ orbitals. There are a total of 11 electrons in the atom. This represents the element sodium.



The orbitals of an atom fill in a specific sequence. The pattern fits very nicely with various regions of the periodic table. The table is sectioned into blocks which are labeled: *s* block, *p* block, *d* block, and *f* block. The rows of each block are labeled as well. Using this shortcut, electron configurations can be determined easily. The element manganese is the fifth element in the $3d$ row. The orbitals before the $3d$ orbital are all filled so it has full $1s$, $2s$, $2p$, $3s$, $3p$, and $4s$ orbitals. Since manganese is the fifth element in the $3d$ row we designate the $3d$ orbital with 5 electrons.

Electron configurations can be abbreviated by writing the element symbol for the previous noble gas in brackets, followed by the remaining electrons. For example, rather than writing all of the electrons in antimony (element 51), the first 36 electrons are represented by [Kr]. The remaining electrons are notated using orbital names and superscript numbers.



Write the name and symbol for the atoms with the following electron configurations.

- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^7$
- $1s^2 2s^2 2p^6 3s^2 3p^1$
- [Rn] $7s^2 5f^9$
- [Xe] $6s^2 4f^{14} 5d^{10} 6p^2$

Write complete electron configurations for the following substances.

- nitrogen
- magnesium
- niobium
- nickel
- tin
- chlorine

Write abbreviated electron configurations for the following elements.

- arsenic
- thulium
- rubidium
- einsteinium
- platinum
- molybdenum
- sulfur
- zirconium
- argon
- iron
- polonium
- bohrium