Homework - Ion Worksheet

cesium ion Cs^+ 55   54   lost 1   1+

aluminum ion Al^{3+} 13   10   lost 3   3+

unnilseptium atom   Uns   107   107   0   0

Quantum Mechanical Model of an Atom

The quantum mechanical model determines the allowed energies an electron can have and how likely it is to find the electron in various locations around the nucleus.

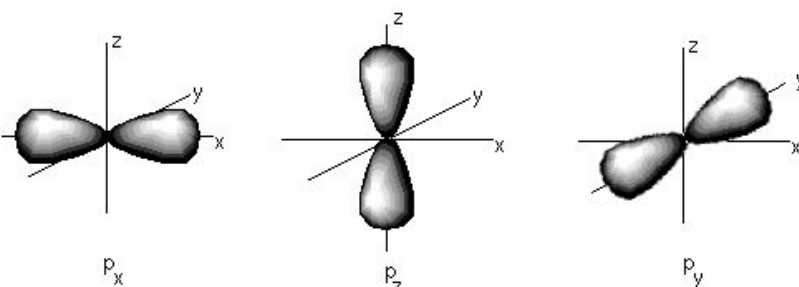atomic orbital - region of space in which there is a high probability to find an electron

Principal quantum numbers (**n**) represent energy levels of electrons (i.e., n = 1, 2, 3, 4, etc.)

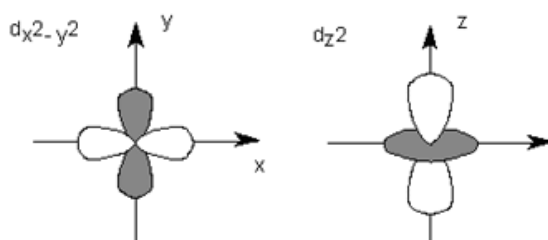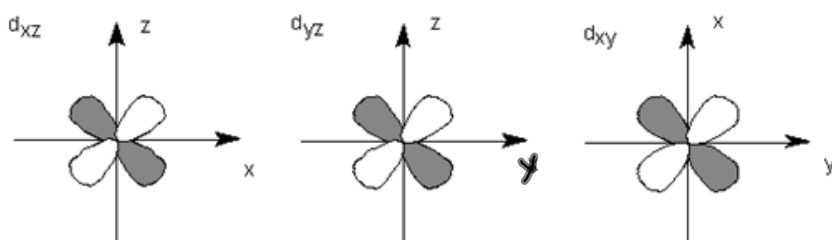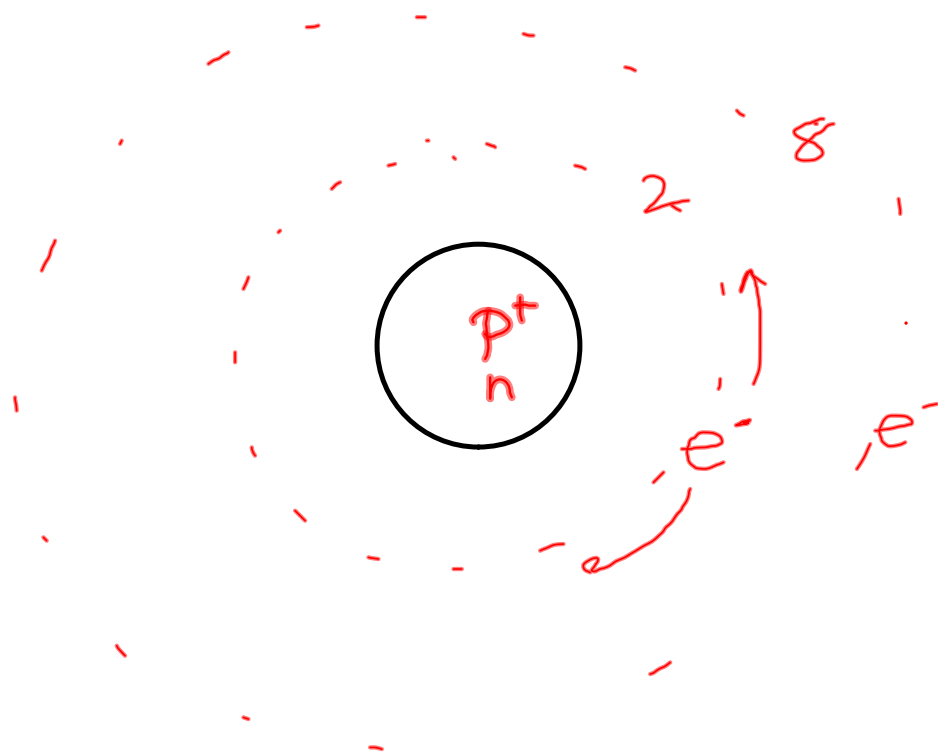There may be several orbitals with different shapes at different energy levels.
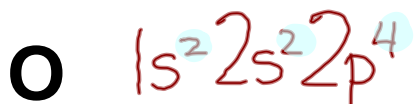
s orbital
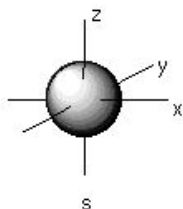
p orbitals

d orbitals

p^+
n

2

8

e^-

e^-

| Principal Energy Level	Number of Sublevels	Type of Sublevel	Number of Orbitals (n^2)	Number of Electrons $(2n^2)$
n = 1	1	1s (1 orbital)	1	2
n = 2	2	2s (1 orbital), 2p (3 orbitals)	4	8
n = 3	3	3s (1 orbital), 3p (3 orbitals), 3d (5 orbitals)	9	18
n = 4	4	4s (1 orbital), 4p (3 orbitals), 4d (5 orbitals), 4f (7 orbitals)	16	32

Electron Configurations

Electron configurations are the ways in which electrons are arranged in different orbitals around the nuclei of atoms, according to the quantum mechanical model (equivalent to the Bohr model of the Bohr Theory).

H $1s^1$

He $1s^2$

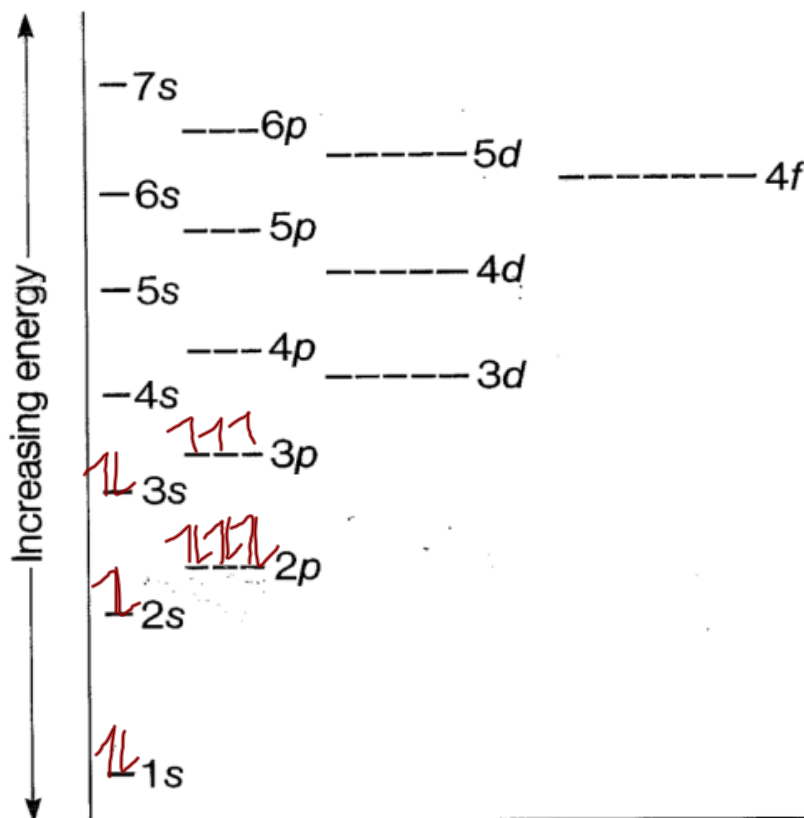**O** $1s^2 2s^2 2p^4$

Aufbau Diagram
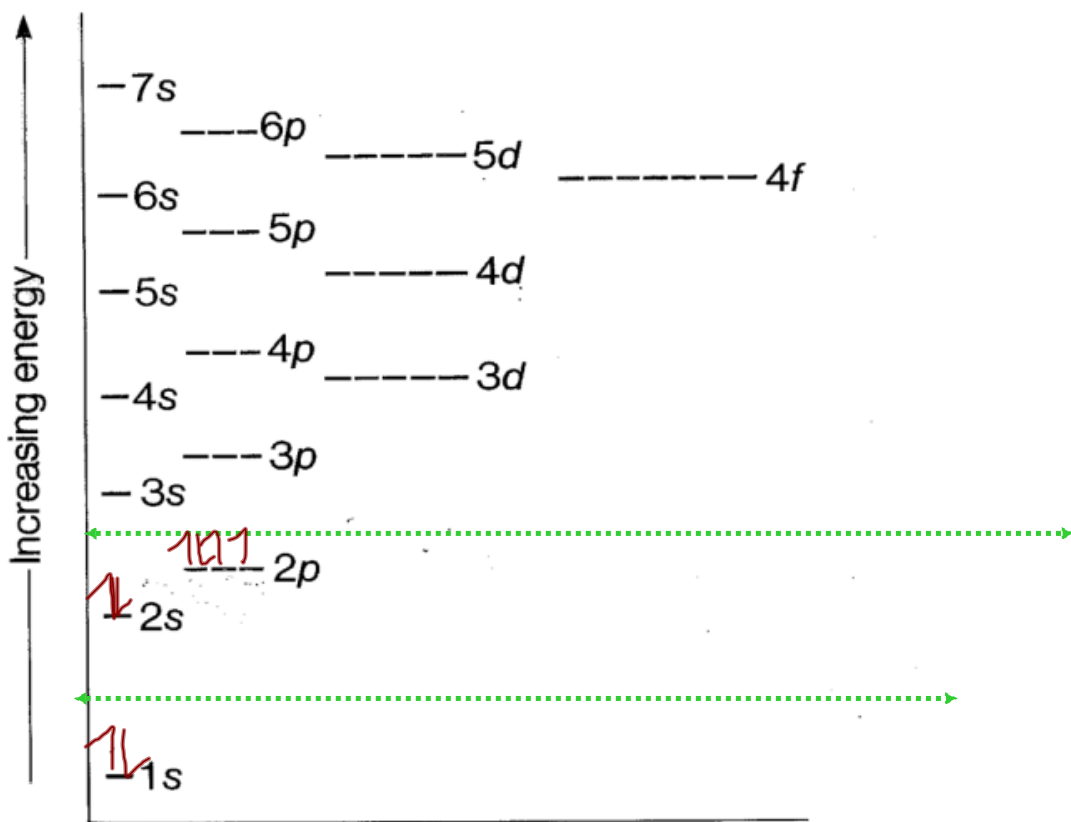
Aufbau principle - electrons occupy orbitals of lowest energy first
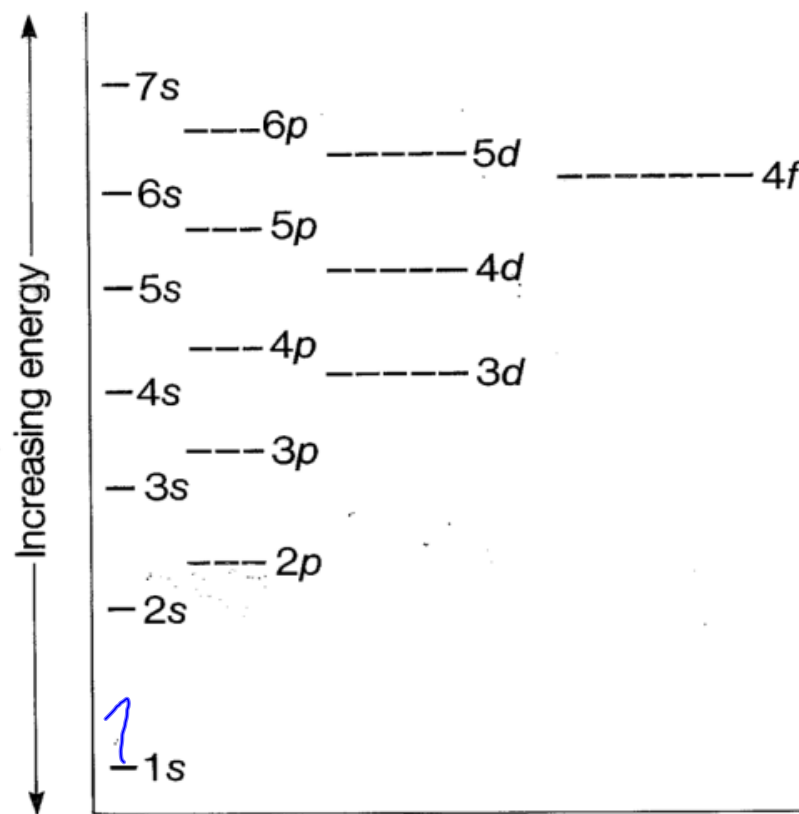
Pauli exclusion principle - an atomic orbital can describe at most two electrons

Hund's rule - one electron enters each orbital until all orbitals contain one electron with the same spin

Homework

Section 5.1 & 5.2   p. 128 - 137

p. 132 #5-7