p. 132 #1-7

7. a) $3p \rightarrow 3$

b) $2s \rightarrow 1$

c) $4p \rightarrow 3$

d) $3d \rightarrow 5$

e) $4f \rightarrow 7$

Quantum Mechanical Model of an Atom

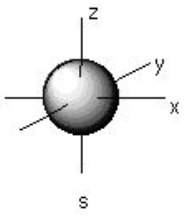
The quantum mechanical model determines the allowed energies an electron can have and how likely it is to find the electron in various locations around the nucleus.

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

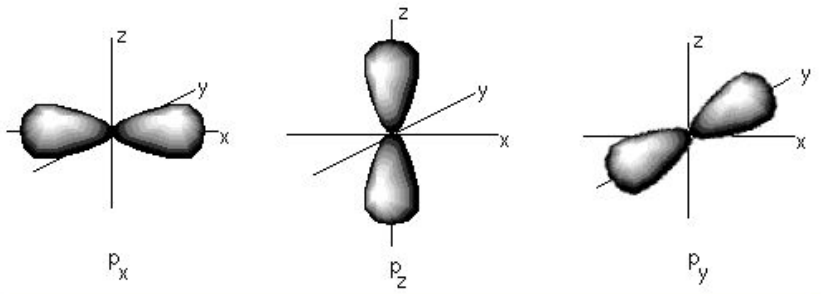
Principal quantum numbers (**n**) represent energy levels of electrons (i.e., n = 1, 2, 3, 4, etc.)

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

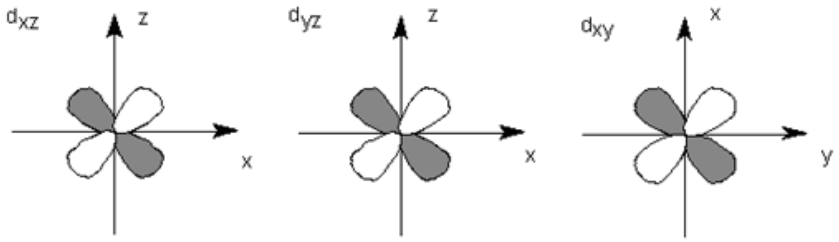
s orbital

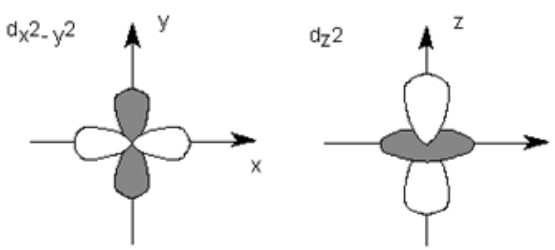


p orbitals



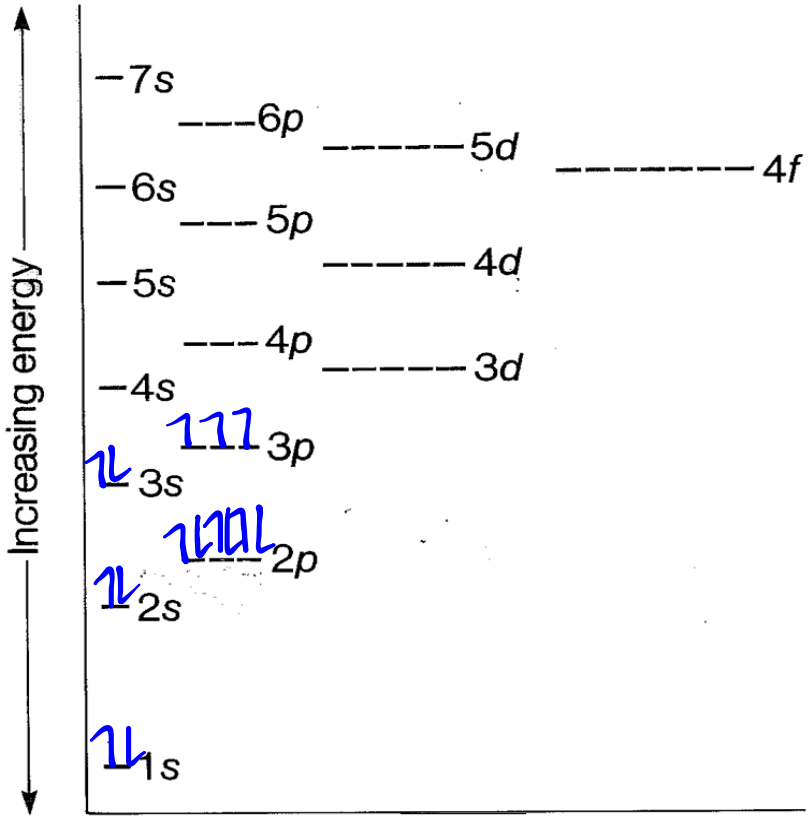
d orbitals





Electron Configurations

Aufbau Diagram



P $1s^2 2s^2 2p^6 3s^2 3p^3$

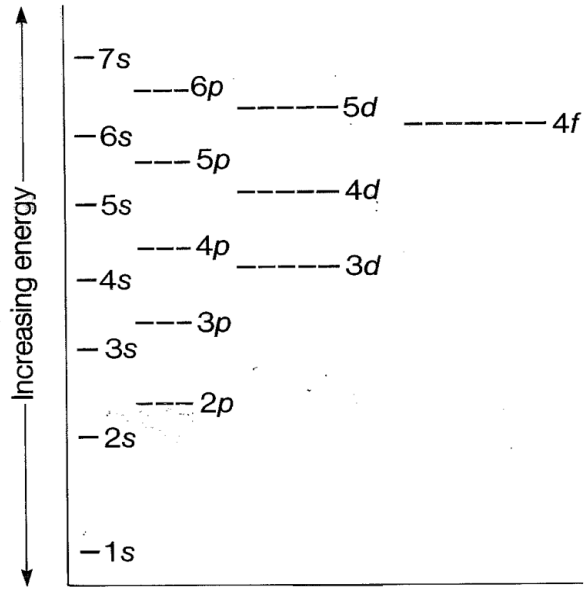
(15) 2 8 5

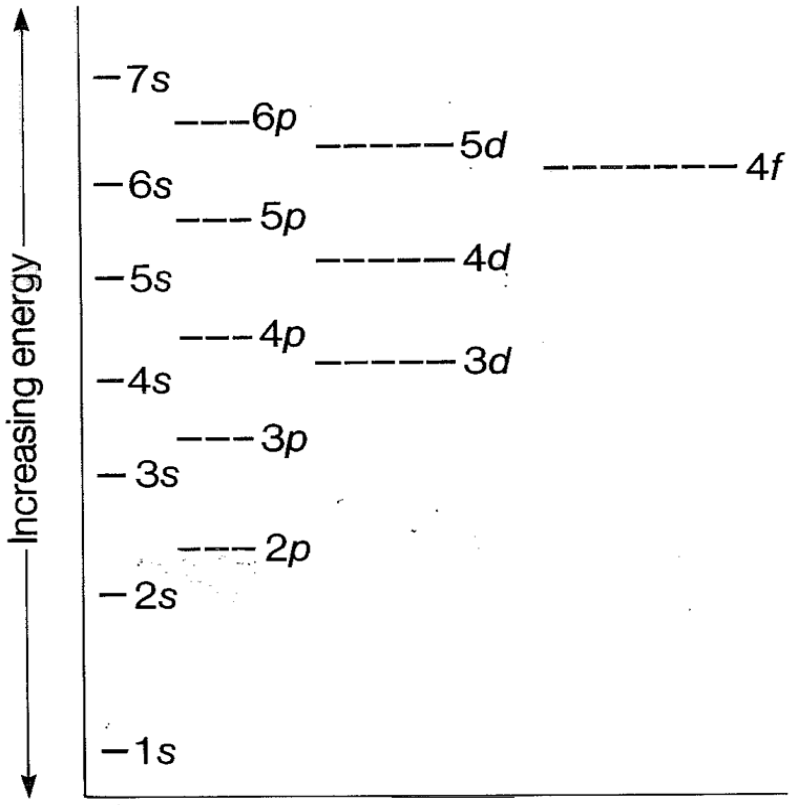
Ti

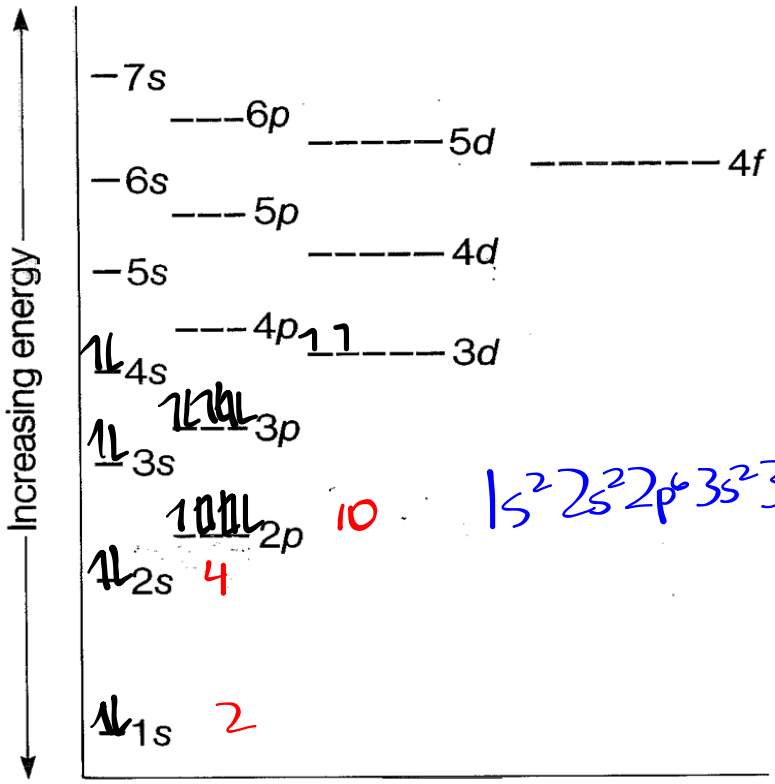
Aufbau principle - electrons occupy orbitals of lowest energy first

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




Increasing energy
7s
6p
5d
4f
6s
5p
4d
5s
4p
3d
4s
3p
3s
2p
2s
1s



Ti (22)

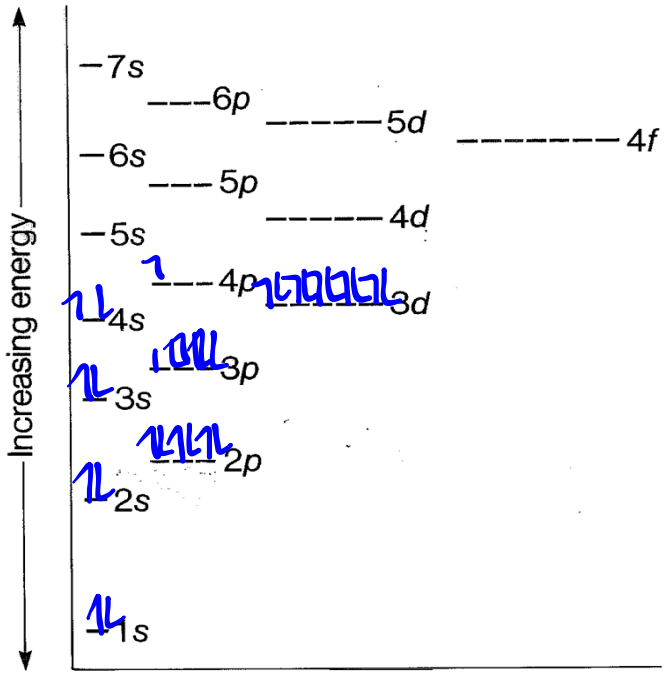
$1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$

$1s^2 2s^2 2p^6 3s^1$

Exceptional Electron Configurations

Although half-filled sublevels are not as stable as filled sublevels, they are more stable than other configurations.

- more likely to occur at higher principal quantum numbers, because of the small energy differences between sublevels.



Cu (29) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$

$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

Homework

Section 5.1 & 5.2 p. 128 - 137

p. 135 #8-9
p. 136 #10-13

http://www.chalkbored.com/lessons/chemistry-12/periodic-configurations.pdf