

**WS 4.4 The Modern Quantum Mechanical Model and Electron Configurations!!!!**

**orbit:** a distinct circular path that an electron makes around the nucleus of an atom.  
(proposed by Niels Bohr in 1913; this idea is rejected in the MQMM)

**orbital** (according to the MQMM of the 1920's):

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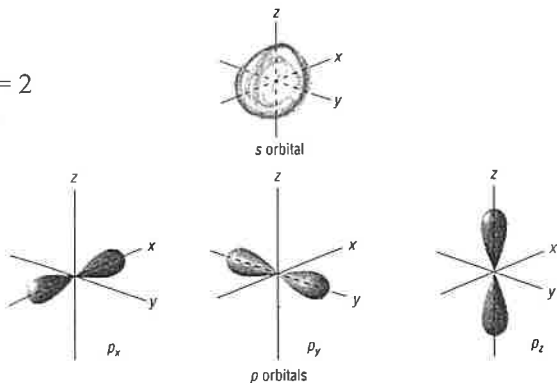
(or, more formally, an orbital is a region in the atom in which the square of the electron wave function,  $\psi^2$ , is significantly above zero.)

*Orbitals for the first four n-levels:*

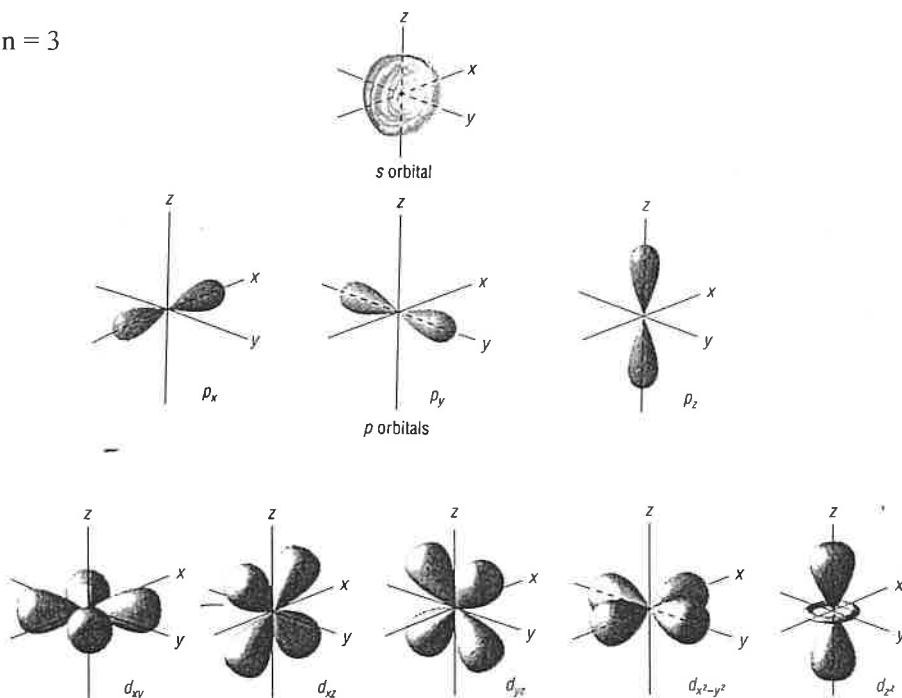
n = 1 (the lowest energy level; closest to the nucleus)



n = 2



n = 3



n = 4

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2. Complete the chart to show the orbital filling order!

1s

2s    2p

an "s" sublevel can hold a total of \_\_\_\_\_ electrons

3s    3p

a "p" sublevel can hold a total of \_\_\_\_\_ electrons

4s    4p

a "d" sublevel can hold a total of \_\_\_\_\_ electrons

5s    5p

an "f" sublevel can hold a total of \_\_\_\_\_ electrons

6s    6p

7s    7p

3. Write the electron configurations for each of the following elements. A few are done for you. (when you are writing electron configurations, assume that the electrons are in the ground state unless told otherwise!)

H  $1s^1$  Na \_\_\_\_\_

He  $1s^2$  Mg \_\_\_\_\_

Li  $1s^2 2s^1$  Al \_\_\_\_\_

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

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

C  $1s^2 2s^2 2p^2$  S  $1s^2 2s^2 2p^6 3s^2 3p^4$

N  $1s^2 2s^2 2p^3$  Cl  $1s^2 2s^2 2p^6 3s^2 3p^5$

O  $1s^2 2s^2 2p^4$  Ar \_\_\_\_\_

F \_\_\_\_\_ K \_\_\_\_\_

Ne \_\_\_\_\_ Ca \_\_\_\_\_

Sc \_\_\_\_\_

4. Based on the electron configuration that you just wrote for Neon (Ne) and Scandium (Sc), draw a picture of each atom, showing all of the orbitals that are occupied:

Neon (Ne)

Scandium(Sc)

5. Write the complete electron configuration for each of the following elements:

Es

Fe

W

As

Tc

Am

Rb

Pb