Homework - Ions Worksheet

			+	−		
(7)	cesium ion	Cs^+	55	54	lost 1	H
(12)	selenide ion	Se^{2-}	34	36	gain 2	2−
(20)	unnilseptium atom	Uns	107	107	0	0

15 16 17 18

1+ 2+ 3+ x 3- 2- 1- x

6e-
2e-
8p+
O
S
Se

Quantum Mechanical Model of an Atom

probabilistic

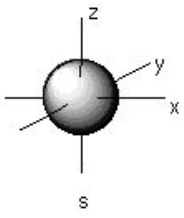
The quantum mechanical model determines the allowed energies an electron can have and how likely it is to find the electron in various locations around the nucleus.

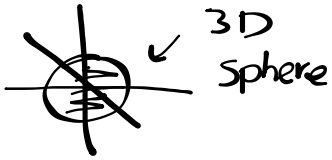
atomic orbital - region of space in which there is a high probability to find an electron

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

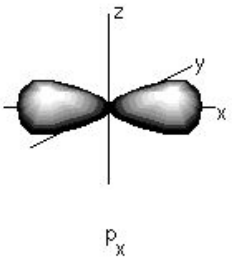
There may be several orbitals with different shapes at different energy levels.

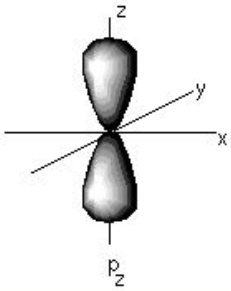
s orbital

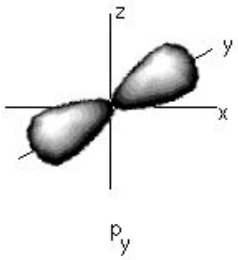




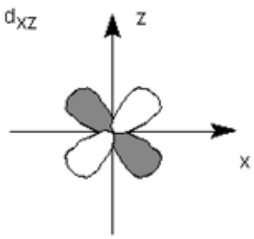
p orbitals

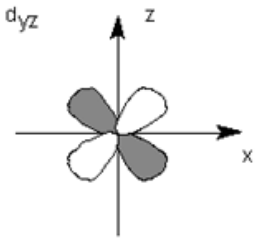


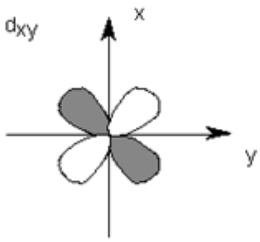


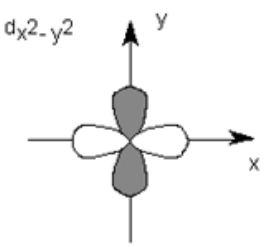


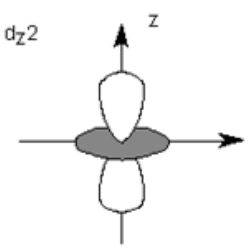
d orbitals

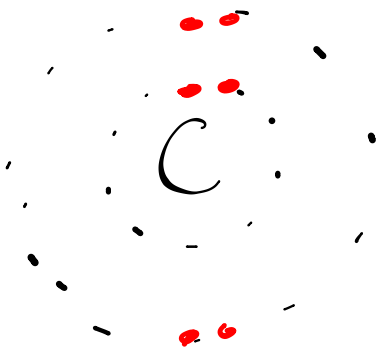












4e-
2e-
6p+
C
Carbon atom

			n^2	$2n^2$
Principal Energy Level	**Number of Sublevels**	**Type of Sublevel**	**Number of Orbitals (n2)**	**Number of Electrons (2n2)**
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

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

H $1s^1$

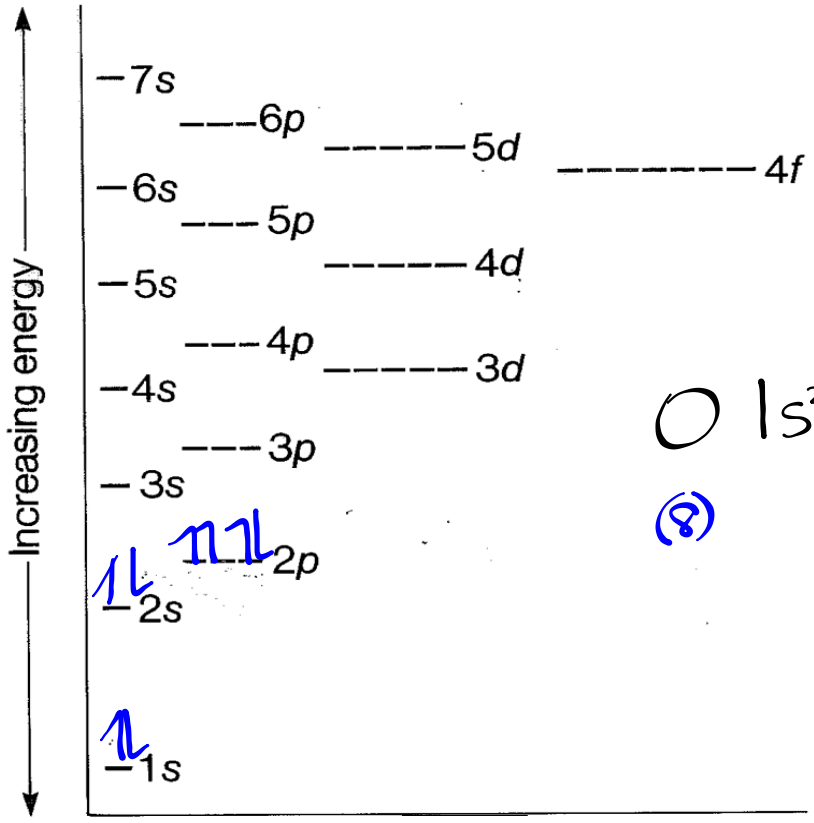
(1)

He $1s^2$

(2)

O

Aufbau Diagram



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

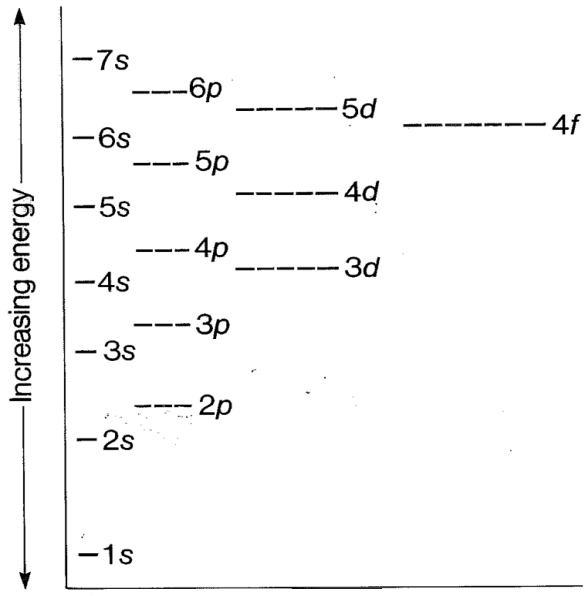
(8)

Ne

P

Sc

Aufbau principle - electrons occupy orbitals of lowest energy first



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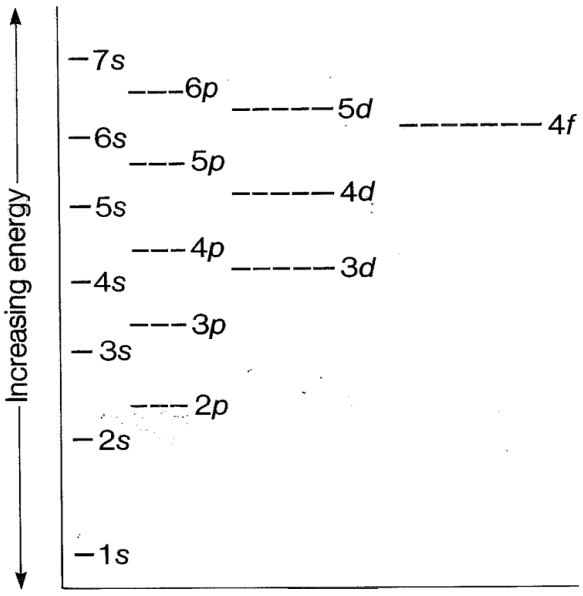

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