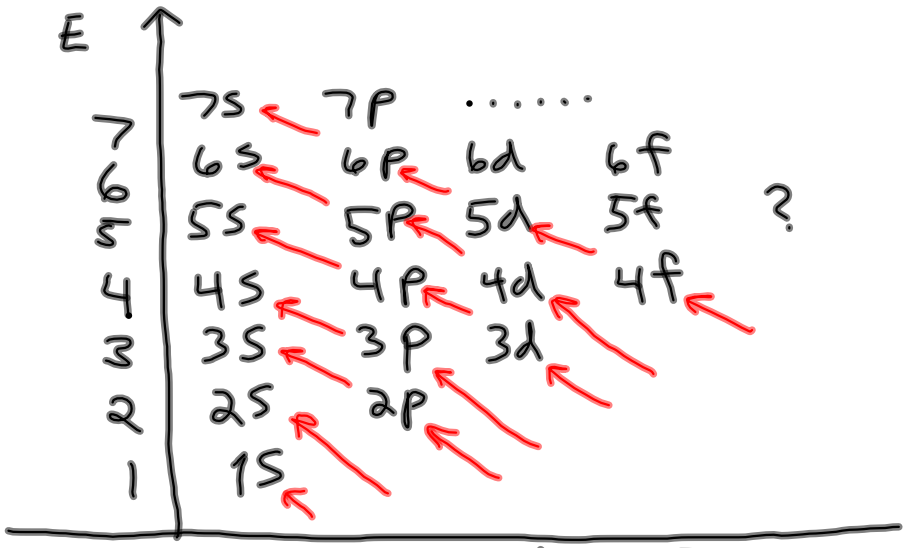
Diagonal Rule

* Used to write e⁻ configurations for multi-electron atoms.

- Electrons in the atom interact (repel) → orbitals overlap (energy)
- Slightly different order of filling orbitals.



e.g. $_{26}Fe - 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$

$_{51}Sb - 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^3$

or $[Kr]\ 5s^2 4d^{10} 5p^3$

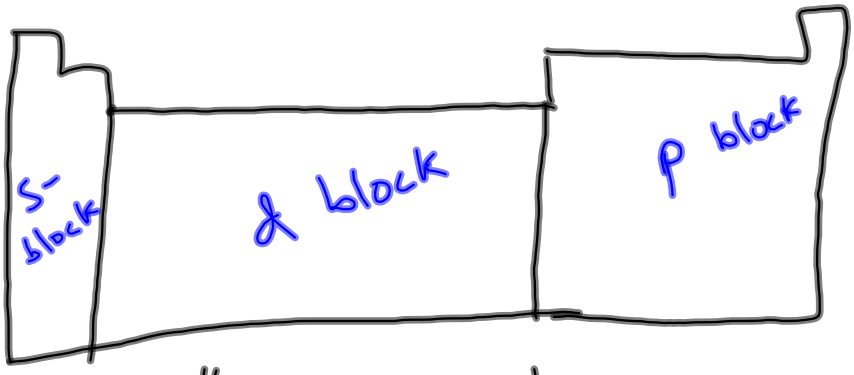
Questions - p.139 #18(a,b,c) #19-22

Electron Configuration and the Periodic Table

$_{6}C - 1s^2 2s^2 2p^2$

$_{14}Si - 1s^2 2s^2 2p^6 3s^2 3p^2$

$_{32}Ge - 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^2$

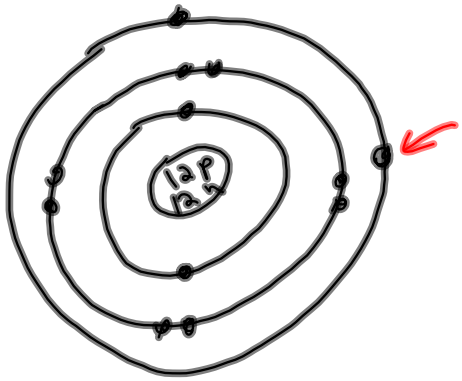


"d" overlaps by one
"f" overlaps by two

Valence Electrons

Valence electrons are those in the outermost principle E level.

e.g.



valence

$_{12}Mg - 1s^2 2s^2 2p^6 3s^2$

Mg tends to lose $2e^-$ to make a +2 charged ion.

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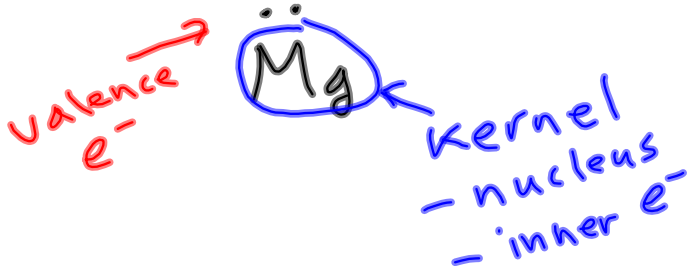
Electron Dot Diagrams



H_2

- Use periodic table to predict ion charges, valence e⁻'s

Quest. P. 141 #23, 28

See answer sheet Ch. 5 & 6

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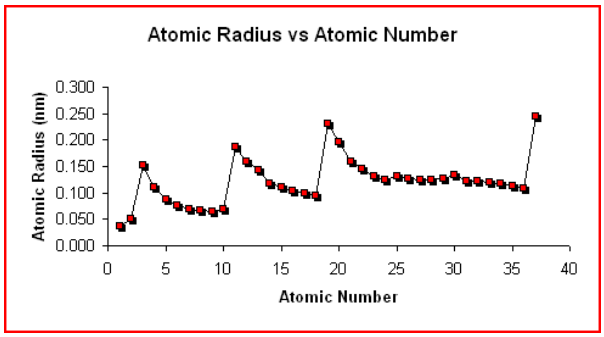
patterns

Trends in the Periodic Table
Atomic Radius (size)



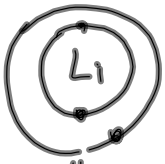
A - Down a column

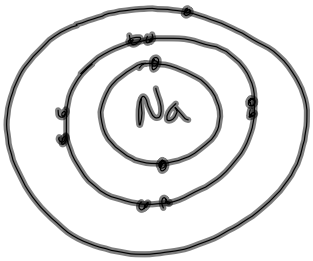
B - Across a row

* periodic table

As we move down a column, size (radius) increases.

Reason -

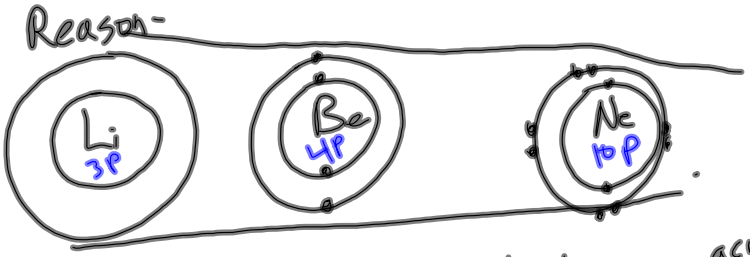




"Energy Levels"

B. Across a row of table — atoms get smaller

Reason -



More protons attracting electrons .... across

↑ nuclear charge

Examples - 1. which is larger For $Cl^?$

Cl is larger - same col.
- more energy levels

2. Which is smaller, Na or $Al^?$

Al - smaller - protons ....
- nuclear charge....

Questions p.175 #52, 62