What is the electronic configuration of ^{13}Al?

A) $1s^2\ 2s^2\ 3s^2\ 4s^2\ 5s^2\ 6s^2 7s^1$

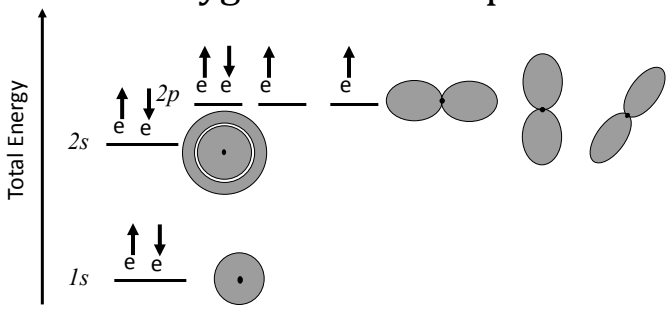
B) $1s^2\ 2s^2\ 2p^2\ 3s^2\ 3p^2\ 3d^2 4s^2$

C) $1s^2\ 2s^2\ 2p^6\ 3s^2 3p^1$

D) $[Ne]\ 3s^2 3p^1$

Which are the valence electrons of ^{13}Al?

Oxygen = $1s^2\ 2s^2\ 2p^4$



a) Which are the valence electrons?

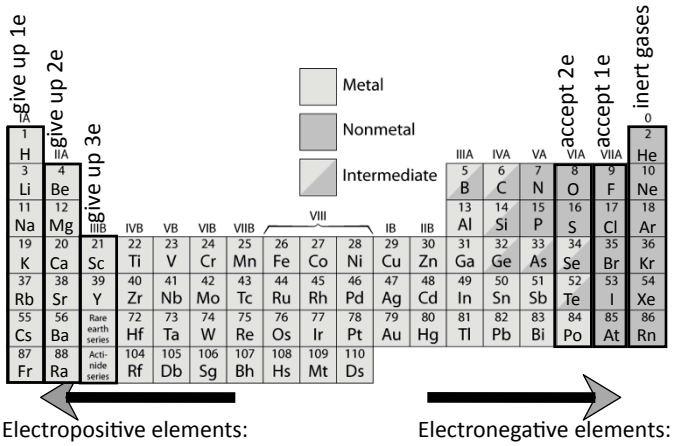
b) When is an atom excited?

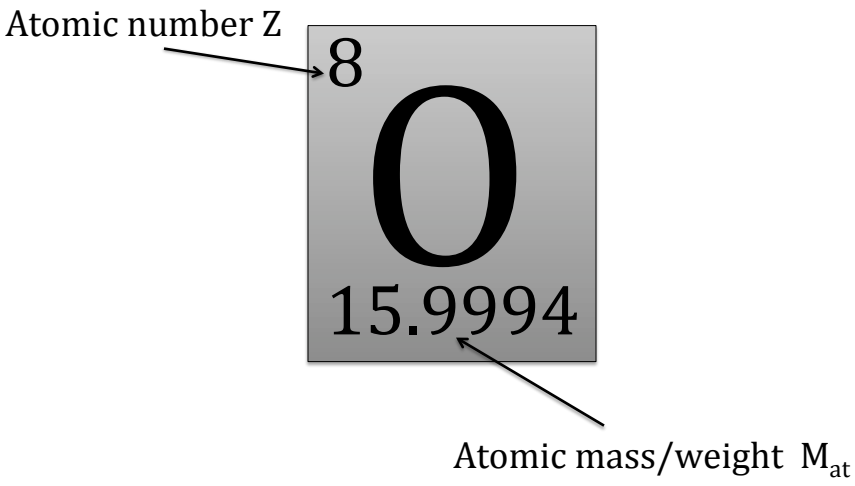
c) What is ionization energy?

d) What is electron affinity?

The Periodic Table

- Columns: Similar **Valence** Structure



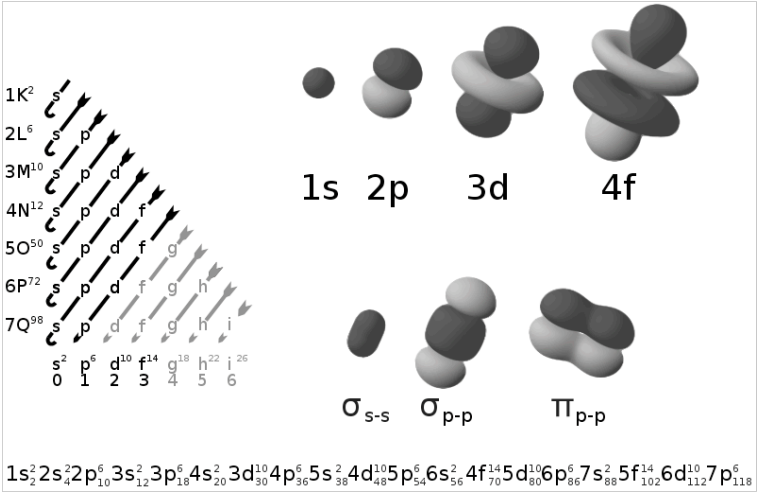


What is Avogadro's number N_A?

What is a mole of a substance?

1.3 Bonding and types of solids

Approximate order of filling of atomic orbitals:



$1s^2_2 2s^2_4 2p^6_{10} 3s^2_{12} 3p^6_{18} 4s^2_{20} 3d^{10}_{30} 4p^6_{36} 5s^2_{38} 4d^{10}_{48} 5p^6_{54} 6s^2_{56} 4f^{14}_{70} 5d^{10}_{80} 6p^6_{86} 7s^2_{88} 5f^{14}_{102} 6d^{10}_{112} 7p^6_{118}$

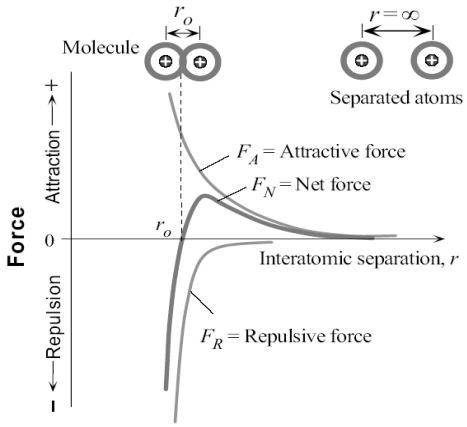
- How many valence electrons does carbon have?

C (atomic number = 6)

A) 2
B) 4
C) 6
D) None

$1s^2$ $2s^2\ 2p^2$

valence electrons



(a) Force vs r

$F_{net} = F_{attractive} + F_{repulsive}$

Equilibrium: $F_{net} = 0$

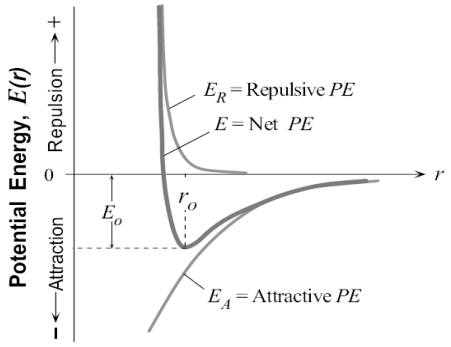
What is the relationship between force and (potential) energy?

A) $PE = -\dfrac{\partial \vec{F}}{\partial \vec{r}}$

B) $PE = -\int \vec{F} \cdot d\vec{r}$

C) $PE = \dfrac{\partial^2 \vec{F}}{\partial \vec{r}^{\,2}}$

D) ????



(b) Potential energy vs r

$E = PE_{net} = PE_{attractive} + Pe_{repulsive}$
$= E_A + E_R$

How do we find the equilibrium separation?

(i.e. the separation at which the energy is minimum?)

$$E = PE_{net} = E_A + E_R$$