

# Electron Configuration Problems

Electron Configuration = a walk through the table

What element has the electron configuration  $1s^2 2s^2 2p^4$ ?

Oxygen

What period is it in? 2

What group is it in? 6

Without "Table"  
Coefficient = period  
"A" Group = s + p



|   |    |                   |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |
|---|----|-------------------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| 1 |    |                   |    |    |    |    |    |    |    |    |    |     |     |     |     |     | 18  |     |
| 1 | H  |                   |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     | He  |
| 2 | Li | Be                |    |    |    |    |    |    |    |    |    |     | B   | C   | N   | O   | F   | Ne  |
| 3 | Na | Mg                |    |    |    |    |    |    |    |    |    |     | Al  | Si  | P   | S   | Cl  | Ar  |
| 4 | K  | Ca                | Sc | Ti | V  | Cr | Mn | Fe | Co | Ni | Cu | Zn  | Ga  | Ge  | As  | Se  | Br  | Kr  |
| 5 | Rb | Sr                | Y  | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd  | In  | Sn  | Sb  | Te  | I   | Xe  |
| 6 | Cs | Ba                | La | Hf | Ta | W  | Re | Os | Ir | Pt | Au | Hg  | Tl  | Pb  | Bi  | Po  | At  | Rn  |
| 7 | Fr | Ra                | Ac | Rf | Db | Sg | Bh | Hs | Mt | Ds | Rg | Uub | Uut | Uuq | Uup | Uuh | Uus | Uuo |
|   |    | Lanthanide Series |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |
|   |    | Ce                | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er  | Tm  | Yb  | Lu  |     |     |     |
|   |    | Actinide Series   |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |
|   |    | Th                | Pa | U  | Np | Pu | Am | Cm | Bk | Cf | Es | Fm  | Md  | No  | Lr  |     |     |     |

Identify the elements with electron configurations

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

|   |    |                   |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |
|---|----|-------------------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| 1 |    |                   |    |    |    |    |    |    |    |    |    |     |     |     |     |     | 18  |     |
| 1 | H  |                   |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     | He  |
| 2 | Li | Be                |    |    |    |    |    |    |    |    |    |     | B   | C   | N   | O   | F   | Ne  |
| 3 | Na | Mg                |    |    |    |    |    |    |    |    |    |     | Al  | Si  | P   | S   | Cl  | Ar  |
| 4 | K  | Ca                | Sc | Ti | V  | Cr | Mn | Fe | Co | Ni | Cu | Zn  | Ga  | Ge  | As  | Se  | Br  | Kr  |
| 5 | Rb | Sr                | Y  | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd  | In  | Sn  | Sb  | Te  | I   | Xe  |
| 6 | Cs | Ba                | La | Hf | Ta | W  | Re | Os | Ir | Pt | Au | Hg  | Tl  | Pb  | Bi  | Po  | At  | Rn  |
| 7 | Fr | Ra                | Ac | Rf | Db | Sg | Bh | Hs | Mt | Ds | Rg | Uub | Uut | Uuq | Uup | Uuh | Uus | Uuo |
|   |    | Lanthanide Series |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |
|   |    | Ce                | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er  | Tm  | Yb  | Lu  |     |     |     |
|   |    | Actinide Series   |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |
|   |    | Th                | Pa | U  | Np | Pu | Am | Cm | Bk | Cf | Es | Fm  | Md  | No  | Lr  |     |     |     |

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

Ne

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

Si

Write the ground state electron configuration of:

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

Manganese  
 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$

Nickel  
 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$

Chlorine  
 $1s^2 2s^2 2p^6 3s^2 3p^5$

What is the # of valence electrons in atoms of carbon & silicon?  
 Carbon and Silicon members of family 4A → 4 electrons

Which group of the Periodic Table does  $ns^2np^4$  represent? VI A  
 Which Atoms Are Isoelectronic?

$N^{3-}$  [Ne] &  $F^-$  [Ne] Yes, both have same configuration (Ne)

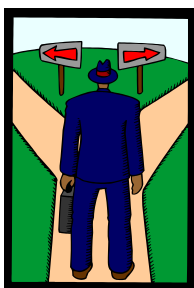
$K^+$  [Ar] &  $Br^-$  [Kr] No, different outer shells

$C^{4+}$  [Ne] &  $O^{2-}$  [Ne] Yes, both have same configuration (Ne)

$Mg^{2+}$  [Ne] &  $Ca^{2+}$  [Ar] No, different outer shells

|   |    | Periodic Table of the Elements |       |      |     |      |       |      |    |     |     |     |      |     |    |
|---|----|--------------------------------|-------|------|-----|------|-------|------|----|-----|-----|-----|------|-----|----|
|   |    | IA                             | IIA   |      |     |      |       |      |    |     |     |     | IIIA | IVA | VA |
| 1 | H  |                                |       |      |     |      |       |      |    |     |     | B   | C    | N   |    |
| 2 | Li | Be                             |       |      |     |      |       |      |    |     |     |     | Al   | Si  | P  |
| 3 | Na | Mg                             | III B | IV B | V B | VI B | VII B | VIII |    |     | IX  | X   | XI   | XII |    |
| 4 | K  | Ca                             | Sc    | Ti   | V   | Cr   | Mn    | Fe   | Co | Ni  | Cu  | Zn  | Ga   | Ge  | As |
| 5 | Rb | Sr                             | Y     | Zr   | Nb  | Mo   | Tc    | Ru   | Rh | Pd  | Ag  | Cd  | In   | Sn  | Sb |
| 6 | Cs | Ba                             | *La   | Hf   | Ta  | W    | Re    | Os   | Ir | Pt  | Au  | Hg  | Tl   | Pb  | Bi |
| 7 | Fr | Ra                             | +Ac   | Rf   | Ha  | Sa   | Ns    | Hs   | Mt | 110 | 111 | 112 | 113  |     |    |

### Path To Success



**Start at Hydrogen**  
**Walk Through Tables –one electron at a time**  
**until**  
**Element or Configuration is reached**