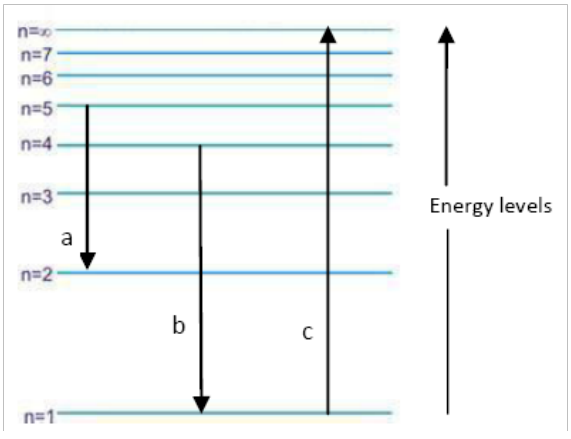
SL & HL Answers to Electron configuration questions

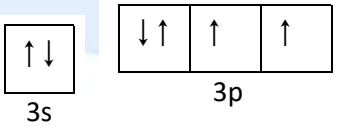
1.



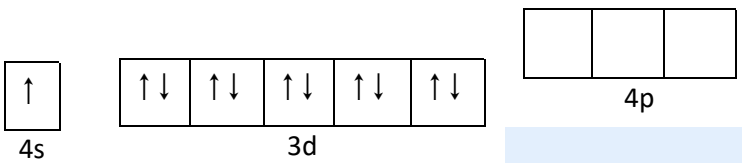
2. **i.** (N) $1s^2 2s^2 2p^3$ **ii. (**Br) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 44s^2 p^5$ (or $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$)
iii. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$ (or $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$)
iv. (Fe^{3+}) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$ **v.** (Cr) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$ (or $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$)
vi. (Ge^{2+}) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$ or $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$

3.

i. sulfur, S [Ne]



ii. copper, Cu [Ar]



4. The three p orbitals are of equal energy and are orthogonal to each other. The p_x orbital lies along the x-axis, p_y lies along the y-axis and p_z lies along the z-axis.

5. For the free potassium atom the 4s sub-energy level is lower than the 3d sub-energy level so contains one electron whilst the 3d level remains empty giving the electron configuration $[Ar]4s^1$. Cu has the electron configuration $[Ar]3d^{10}4s^1$ (or $[Ar]4s^1 3d^{10}$) so when the 4s is electron is removed to form Cu^+ it leaves a full 3d sub-energy level.