Problem solving and Calculations

SET 8: Electron Configuration-Answers

1. Complete the following table:

	Symbol	Atomic number	Number of protons	Number of electrons	Number of neutrons
A	$^{16}_{8}X$	8	8	8	8
B	$^{17}_{8}X$	8	8	8	9
C	$^{16}_{8}X^{2-}$	8	8	10	8
D	$^{17}_{9}X$	9	9	9	8

2. A, B and C are isotopes as they all have the same atomic number and are therefore the same element.

3. The number of protons is the atomic number and hence the element identity. The number of electrons and therefore the number of electrons gained or lost give the chemical properties hence the personality.

4. a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$
   b) $1s^2\ 2s^2\ 2p^6$
   c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$
   d) $1s^2\ 2s^2\ 2p^2$

5. Note: Neutral atoms of elements have the same number of electrons as protons. For each atom count the number of electrons by adding the superscript numbers (the 2 in this example 1s2)
   a) Number electrons = 2+2+6+2+5 = 17. Number of protons (atomic number) = 17.
   The element is Chlorine Cℓ
   b) Calcium (Ca)
   c) Aluminium (Aℓ)
   d) Iron (Fe)

6. Electrons first fill the lower energy levels to give a ground state electron configuration. Atoms not in the ground state will have electrons in higher energy levels leaving unfilled lower energy level.
   b) Has electrons in the higher 4s level yet the 3p level is unfilled
   c) Has an unfilled 2s orbital