Edexcel IGCSE Chemistry

Topic 1: Principles of chemistry

Atomic structure

Notes

1.14 know what is meant by the terms atom and molecule

- All substances are made of atoms
- A substance with only one sort of atom = element
  - An atom is the smallest piece of an element that can exist
- A molecule = formed when atoms join together by chemical bonds (can be made of atoms of the same element)

1.15 know that the structure of an atom in terms of the positions, relative masses and relative charges of sub-atomic particles

subatomic particle	relative mass	relative charge	position
proton	1	+1	in the nucleus
neutron	1	0	in the nucleus
electron	1/1836	-1	in shells around nucleus

1.16 know what is meant by the terms atomic number, mass number, isotopes and relative atomic mass (Ar)

- Atomic (proton) Number = number of protons (= number of electrons if it's an atom, because atoms are neutral)
- Mass (nucleon) Number = number of protons + neutrons
- Isotopes = different atoms of the same element containing the same number of protons but different numbers of neutrons in their nuclei
- Relative atomic mass (of an element) = an average value that takes account of the abundance of the isotopes of the element

1.17 be able to calculate the relative atomic mass of an element (Ar) from isotopic abundances

e.g.
A sample of chlorine gas is a mixture of 2 isotopes, chlorine-35 and chlorine-37. These isotopes occur in specific proportions in the sample i.e. 75% chlorine-35 and 25% chlorine-37. Calculate the R.A.M. of chlorine in the sample.

The average mass, or R.A.M. of chlorine can be calculated using the following equation:

R.A.M. $= \dfrac{\text{(mass of isotope-A} \times \text{ \% of isotope-A)} + \text{(mass of isotope-B} \times \text{ \% of isotope-B)}}{100}$

$= \dfrac{(35 \times 75) + (37 \times 25)}{100}$

$= \dfrac{3550}{100}$

R.A.M. $= 35.5$