

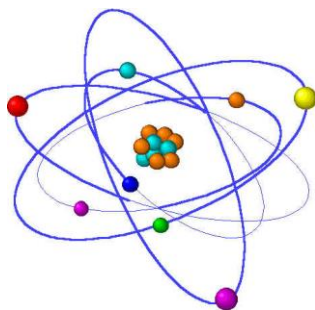
Australian Islamic College

Science Holiday Homework

Chemistry Term 4' 2017

Due: Week 1, Term 4

Validation Test: Monday, Week 2, Term 4



Year 10

PART 1: RELATIVE ATOMIC MASS (A_r) & RELATIVE MOLECULAR MASS (M_r)

The mass of individual atoms is very small and hence it is more convenient to use relative masses. This means that the mass of each atom is compared to a standard which is an isotope of carbon, carbon-12.

The relative atomic mass of an element is the ratio of the average mass of one atom of an element to one twelfth of the mass of an atom of carbon-12.

Relative Atomic Mass Scale

What is the Relative Atomic Mass Scale (^{12}C Carbon Scale)?

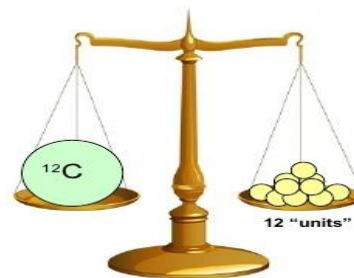
- masses of atoms are expressed relative to the mass of a Carbon-12 atom.

Why is there a need for the scale?

- atoms are too small to be weighed directly.
- inconvenient to express masses of atoms in terms of kg.

So what does it imply?

- 1 atom of ^{12}C = 12
- $1/12$ the mass of a ^{12}C atom = 1



Note: Relative atomic masses have **no units (dimensionless)** since they are relative to the arbitrary standard (i.e. ratio). However, in more advanced texts, relative masses are represented in terms of atomic mass units (u)

QUESTIONS

Complete the following table by using a Periodic table. (18 Marks)

ELEMENT	Chemical Symbol	RELATIVE ATOMIC MASS
Iodine		
Potassium		
Sulfur		
Boron		
Helium		
Copper		
Krypton		
Silver		
Phosphorus		

RELATIVE MOLECULAR MASS

The relative molecular mass of an element is the ratio of the average mass of one molecule of an element or compound to one twelfth of the mass of an atom of carbon-12.

Relative molecular mass

Definition: Sum of all the relative atomic masses of all atoms present in a molecule.

e.g. : Molecular formula of sulphuric acid is H_2SO_4 , determine its relative molecular mass.
 [RAM: H=1.00; S=32.0; O=16.0]

Ans:
 $\text{RMM H}_2\text{SO}_4 = 2 \times 1.00 + 32.0 + 4 \times 16.0 = 98.0$

QUESTIONS

Q1. Complete the following table by using a Periodic table & Date sheet. (18 Marks)

Chemical Compound	Molecular Formula	Relative Molecular Mass
Sulfuric Acid		
Calcium Carbonate		
Ethanol		
Magnesium Hydroxide		
Zinc chloride		
Ammonium Sulfate		
Lead(II)nitrate		
Carbon dioxide		
Hydrogen peroxide		

Part 2: Percentage Composition

Percent **Composition** by Mass. Percent **composition** is calculated from a molecular formula by dividing the mass of a single element in one mole of a compound by the mass of one mole of the entire compound. This value is presented as a **percentage**.

Percent Composition

Mass percent of an element:

$$\text{mass \%} = \frac{\text{mass of element in compound}}{\text{mass of compound}} \times 100\%$$

For iron in iron (III) oxide, (Fe₂O₃)

Question

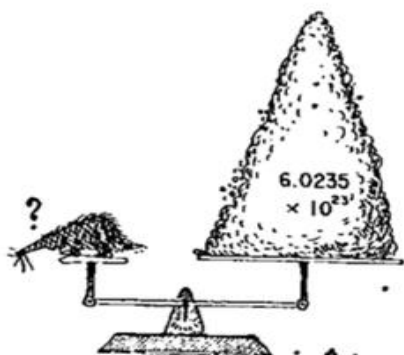
Calculate the Percentage composition of the following elements in the given Compounds. **(10 Marks)** .

Chemical compound	Number of each type of atom present	Percentage Composition
NaCl	chlorine atom	
AlCl ₃	Aluminum atom	
AgNO ₃	Nitrogen atom	
PbS	Lead atom	
C ₃ H ₈	Carbon Atom	
Fe ₂ O ₃	Iron atom	
NH ₃	Hydrogen atom	
H ₂ O	Hydrogen atom	
Na ₂ O	Sodium atom	
Mg(NO ₃) ₂	Nitrogen atom	

Part 3: THE MOLE

The mole(n) is a number that chemists use to count large number of particles. The mole is the amount of substance containing Avogadro's number(N_A) of particles.

The Mole



The amount of a substance
that contains
 6.02×10^{23} particles.

602,000,000,000,000,000,000,000
= Avogadro's Number

QUESTIONS:

Q1. Calculate the number of moles of

a). Calcium atoms in 6.02×10^{23} atoms of Calcium. (2 Marks)

b). Silver atoms in 0.25moles of silver. **(2 Marks)**

c). Nitrogen molecules in 2.5moles of nitrogen gas. **(2 Marks)**

d). Potassium hydroxide in 240g of potassium hydroxide. **(2 Marks)**

Q2. Layla dissolved a tablespoon(30.0g) of sugar($C_{12}H_{22}O_{11}$) into 100g of water.

Which substance contained the greatest number of oxygen atoms, the sugar or the water? **(4Marks)**