p.31 #21-d

$2\,Al(NO_3)_3 + 3\,H_2SO_4 \rightarrow Al_2(SO_4)_3 + 6\,HNO_3$

$Al(NO_3)_3$

Al - 2
N - 6
S - 3
H - 6
O - 18 + 12 = 30

Al - 2
N - 6
S - 3
H - 6
O - 12 + 18 = 30

Average Atomic Mass

Recall- Atomic Mass Number (#p + #n)

$^{11}_{6}C$ or $^{12}_{6}C$ or $^{13}_{6}C$ or $^{14}_{6}C$

In nature- there is a mixture of isotopes.
We use average atomic mass.

e.g. Carbon 12.01 a.m.u.

e.g. Calculate the average molecular mass- atomic mass units (u)

e.g. NaCl

Na- 22.99
Cl- 35.45
58.44 u

e.g. Na_2CO_3-

2Na = 2x22.99 = 45.98
1-C = 1x12.01 = 12.01
3-O = 3x16.00 = 48.00
105.99 u

The Mole

Text p. 48

Definition- An Avogadro's number of particles. $* 6.02 \times 10^{23}$

A mole of particles has an equivalent mass in g. (instead of a.m.u)

e.g.

Molecule	Mole
1-molecule NaCl 58.44 u	1-Mole NaCl particles 58.44 g

e.g. molar mass of $Na_2CO_3 = 105.99$ g

Questions p. 57 #16-19

Mole <--> Mass Calculations

Example- 1 mol H_2O

2-H $2 \times 1.01 = 2.02$ g
1-O $1 \times 16.00 = 16.00$ g
$= 18.02$ g

How many moles in 36.04 g H_2O?

$$36.04 \text{ g } H_2O \times \frac{1 \text{ mol } H_2O}{18.02 \text{ g } H_2O} = 2.00 \text{ mol } H_2O$$

molar mass

Example- How many moles of Na_2CO_3 in 5.0 g of Na_2CO_3?

$$5.0 \text{ g } Na_2CO_3 \times \frac{1 \text{ mol } Na_2CO_3}{105.99 \text{ g } Na_2CO_3} = 0.047 \text{ mol } Na_2CO_3$$

Example- What is the mass of 4.6 mol Na_2CO_3

$$4.6 \text{ mol } Na_2CO_3 \times \frac{105.99 \text{ g } Na_2CO_3}{1 \text{ mol } Na_2CO_3} = 487 \text{ g } Na_2CO_3$$

Questions p. 59 #20-25 (choose)

Concentration -mol/L

A

B (more concentrated)

Units $\frac{\text{mole}}{\text{L}}$ ← solute

← volume

Stoichiometry - Molecule, Mole