

CHAPTER 12

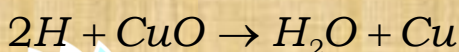
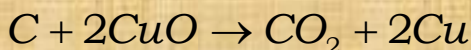
General Organic Chemistry

The series of tests carried for estimating the amounts of various elements present in organic compound is known as Quantitative analysis.

Estimation of carbon & hydrogen:

Liebig's method:

- A known weight of organic compound is heated strongly with excess of dry copper oxide in current of dry air or oxygen.
- Carbon present in the organic compound is oxidised to carbon dioxide & hydrogen to water.



- Percentage of carbon =

$$\frac{\text{Weight of } CO_2 \text{ formed}}{\text{Weight of organic compound}} \times \frac{12}{44} \times 100$$

- Percentage of hydrogen =

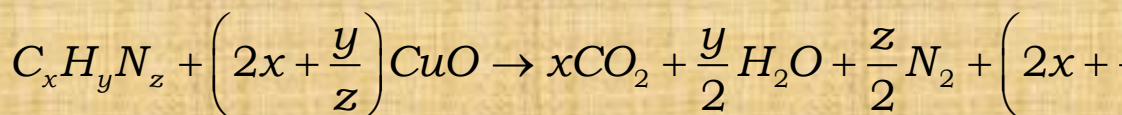
$$\frac{\text{Weight of } H_2O \text{ formed}}{\text{Weight of organic compound}} \times \frac{2}{18} \times 100$$

Estimation of Nitrogen:

There are two methods for the estimation of Nitrogen.

I) Dumas method:

In this method known weight of organic compound is heated strongly with excess of copper oxide free nitrogen produced is collected over an aqueous potassium hydroxide .

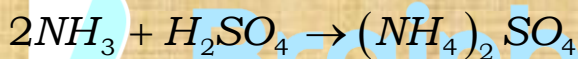
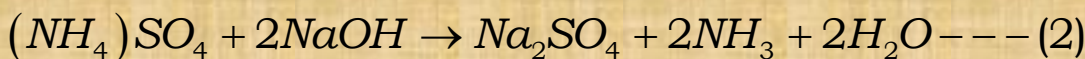
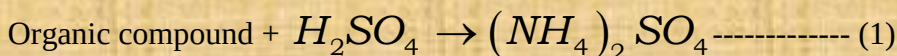


Percentage of Nitrogen =

$$\frac{\text{Volume of } N_2 \text{ at STP in ml}}{\text{Weight of organic compound}} \times \frac{28}{22400} \times 100$$

Kjeldahl's method:

- In this method known weight of the organic compound is heated with conH_2SO_4 nitrogen in the compound gets converted to ammonium sulphate. The obtained ammonium sulphate is boiled with excess of sodium hydroxide.
- The liberated ammonia gas is absorbed in an excess of standard solution of sulphuric acid.
- The amount of ammonia produced is determined by estimation the amount of sulphuric acid consumed in the reaction.



- Percentage of Nitrogen

$$= \frac{\text{Normality of acid} \times \text{Volume of acid in ml}}{\text{Weight of organic compound}} \times \frac{14}{1000} \times$$

$$= 1.4 \times \frac{N_A \times V_A (\text{ml})}{W_{\text{OC}}}$$

$$= 1.4 \times \frac{M_A \times V_A (\text{ml})}{W_{\text{OC}}} \times \text{Basicity of the acid}$$