



Al-Mustaqbal University College
Anesthesia Techniques Department

First Class

General Chemistry

Fourth Lecture

Article Teachers

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Analytical chemistry

Analytical chemistry is the science of obtaining, processing, and communicating information about the composition and structure of matter. In other words, it is the art and science of determining what matter is and how much of it exists.

1- Qualitative analytical : provides information about the identity of an atomic, molecular

2- Quantitative analytical: It is the group of processes in which the composition of the materials, compounds, or elements involved in the composition of a particular substance or mixture of substances, whether in the solid state or in a solution in a particular solvent, this analysis is never exposed to the quantities of these components

Gravimetric analysis

Volumetric analysis

3- instrumental methods of Chemical analysis: The material is estimated by measuring some of its physical or chemical properties such as density, color, refractive index, electrical conductivity, thermal and electrical changes etc,

Solutions

It is a homogeneous mixture of two or more substances, which cannot be separated from each other by any mechanical method, such as filtration, for example, and it consists of a solute and a solvent, and the solvent is usually greater than the solute. They can be separated by evaporation, for example, so that it does not cause any chemical reaction between the two substances, for example, a solution of table salt in water.

1- Saturated solutions

2- Unsaturated solutions

3- Over saturated solutions

A solution is defined as a homogeneous group, solid, liquid or gaseous, consisting of two or more components.

Chemical substances can be of an ionic or molecular nature.

The solutions are divided into several sections according to the nature of the materials (phases) included in its composition:

Standard solution

It is a solution whose volume contains a known weight of the dissolved substance. In other words, the standard solution is a known concentration solution: prepared by dissolving a known weight of the substance to be measured in a known volume of distilled water. Thus, the solutions have a known and accurate concentration.

Concentration

is the ratio of the amount of solute to a solution. The concentration is expressed in units of volume and weight, for example:

- 1- percentage
- 2- The strength of the solution
- 3- Molarity
- 4- Normality

There are three types of percentage concentrations:

1- Volumetric percentages: It expresses the number milliliter (ml) dissolved in (100 ml) of total solution

$$\%(\text{v / v}) = \frac{\text{volume of solute (ml)}}{\text{volume of solution (ml)}} \times 100$$

2- Volumetric-weights percentages: It expresses the number of gram (gm) dissolved in (100 ml) of the total volume of solution

$$\%(\text{w / v}) = \frac{\text{weight of solute (g)}}{\text{volume of solution (ml)}} \times 100$$

3- Weight percentages: It expresses the number of grams (gm) dissolved in the total weight of the solution

$$\%(\text{w / w}) = \frac{\text{weight of solute (g)}}{\text{mass of total solution (g)}} \times 100$$

Questions

Q1\ 5 g of sodium chloride was dissolved in water to form 200 g of solution

What is the weight –volume percentage?

Q2\ A solution consisting of dissolving 10 g of sodium hydroxide NaOH in 100 g of water. Calculate the ratioOf sodium hydroxide