ALMUSTAQBAL UNIVERSITY COLLEGE

Medical Labs Techniques Department

Stage : First year students

Subject :General chemistry 1 - Lecture 1

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General Chemistry - Introduction

Chemistry : is the study of matter, its chemical and physical properties, the chemical and physical changes it undergoes, and the energy changes that accompany those processes.

Major Branches (Areas) of Chemistry

1. ORGANIC CHEMISTRY

Deals with the study of the structure, properties, and preparation of chemical compounds of diverse substances such as plastics, drugs, solvents, industrial chemicals that consist primarily of carbon and hydrogen.

Fields of Organic Chemistry:

a.Medicinal chemistry —the design, development, and synthesis of medicinal drugs.

b.Organometallic chemistry — the study of chemical compounds containing bonds between carbon and a metal.

c.**Polymer chemistry** — the study of the chemistry of polymers.

2. INORGANIC CHEMISTRY

The study of the properties and behavior of inorganic compounds.
It covers all chemical compounds except organic compounds.It study things such as crystal structures, minerals, metals, catalysts, and most elements in the Periodic Table.

Fields of inorganic chemistry :

a.Bioinorganic chemistry — the study of the interaction of metal ions with living tissue, mainly through their direct effect on enzyme activity.
b.Geochemistry — the study of the chemical composition and changes in rocks, minerals, and atmosphere of the earth.
c.**Nuclear chemistry** — the study of radioactive substances.

3. ANALYTICAL CHEMISTRY

Involves the analysis of matter to determine its **composition(qualitative analysis) and the quantity** of each components **(quantitative analysis)** through volumetric , gravimetric or instrumental methods .

Areas using analytical chemistry include:

a.Forensic chemistry — the application of chemical principles, techniques, and methods to the investigation of crime.
b.Environmental chemistry —the study of the chemical changes that occur in the environment which includes atmospheric , aquatic, and soil chemistry.
c.Bioanalytical Chemistry — the detection of the presence of a specific chemicals in biological samples such as blood, urine, hair, saliva, and sweat .

4. PHYSICAL CHEMISTRY

Deals with the study of the effect of chemical structure on the physical properties of a substance.,the rate of a chemical reaction, the interaction of molecules with radiation, and the calculation of structures and properties.

Fields of physical chemistry :

a.Photochemistry — the study of the chemical changes caused by light.
b.Surface chemistry — the study of chemical reactions at surfaces of substances. like adsorption, heterogeneous catalysis and corrosion .
c.Chemical kinetics — the study of the rates of chemical reactions, and the factors affecting those rates,.
d.Quantum chemistry — the mathematical description and interaction of subatomic particles and their relationship to chemical processes.
e.Spectroscopy — the use of the absorption, emission, or scattering of electromagnetic radiation by matters.

5. BIOCHEMISTRY

Is related to the study of chemical reactions that take place in living things (animals, plants and micro organisms) to explain them in chemical terms. Biochemical research includes cancer and stem cell biology, infectious disease, and cell membrane and structural biology.

It spans molecular biology, genetics, biochemical pharmacology, clinical biochemistry, and agricultural biochemistry

Fields of Biochemistry:

a.Molecular biology -
Concerns the study of the molecular basis of biological activity in and between cells, including molecular synthesis, modification, mechanisms and interactions of the different types of DNA, RNA, and protein biosynthesis.

b.Genetics — the study of genes, heredity, and variation in living organisms.
c.Pharmacology — the study of mechanisms of drug action and the influence of drugs on an organism.
d. **Toxicology** — the studies of the effects of poisons on living organisms.
e.Clinical biochemistry — the study of the changes caused by disease in the chemical composition and biochemical processes of the body.
f.Agricultural biochemistry — the study of the chemistry that occurs in plants.

Also there is a huge overlap between Chemistry and other sciences such as Engineering, Biology, Medicine, Physics, Geology and others.