

CHAPTER NO 01

INTRODUCTION TO CHEMISTRY

Q1. Define chemistry. Define various branches of chemistry.

CHEMISTRY:

The branch of science that deals with the study of composition, structure and properties of matter, changes that occurring inside the matter and the laws and principles which govern these changes is called "Chemistry".

BRANCHES OF CHEMISTRY:

There are various branches of chemistry. Some of them are:

1. PHYSICAL CHEMISTRY:

The branch of chemistry that deals with the laws and the principles governing the combination of atoms and molecules in chemical reaction.

2. INORGANIC CHEMISTRY:

The branch of chemistry that deals with the chemistry of elements and their compounds generally obtained from non living organisms such as minerals.

3. ORGANIC CHEMISTRY:

The branch of chemistry in which we study the compounds of carbon with the exception of CO_2 , CO metal carbonates, bicarbonates and carbides. Actually it is the chemistry of hydrocarbons and their derivatives.

4. ANALYTICAL CHEMISTRY:

It is the branch of chemistry that deals with the study of different apparatus and techniques involved to determine the kind quality and quantity of different components in a given substance.

5. BIO CHEMISTRY:

The branch of chemistry that deals with the study of compounds and chemical reaction involves in living organisms such as plants and animal cells is known as "Bio Chemistry".

6. INDUSTRIAL CHEMISTRY:

It is the branch of chemistry that deals with the study of different chemical processes involved in industries for the manufacture of synthetic products.

7. NUCLEAR CHEMISTRY:

It is the branch of chemistry that deals with the study of changes occurring in the nuclei of an atom, accompanied by the emission of invisible radiations.

8. ENVIRONMENTAL CHEMISTRY:

It is the branch of chemistry that deals with the study of interaction of chemical materials and their effect on the environment of humans, animals and plants.

9. POLYMERIC CHEMISTRY:

It is the branch of chemistry that deals specially with the study of polymerization and the products obtained through the process of polymerization such as plastic, synthetic fibres and papers etc.

Q2. Write a note on historical development of chemistry?

HISTORICAL DEVELOPMENT CHEMISTRY:

The history of chemistry can be divided into different periods which are as follows.

i. Greek Period

ii. Muslim Period

iii. Modern Period

1. GREEK PERIOD:

Plato, Aristotle and Democritus are the famous Greek philosophers. They introduced the concept of element, atom and chemical reaction. They thought that all matter was derived from four elements: earth, air, water and fire. These elements had properties such as hot, dry, wet and cold. Most of the concept of Greek Period was proved wrong because they were basically philosophers and did not believe in experiment.

2. MUSLIM PERIOD:

The period from 600-1600 AD in the history of chemistry is known as the period of alchemist. The modern scientific knowledge is based on the contribution of alchemist. They produced three basic mineral acids: Hydrochloric acid (HCl), Sulphuric acid (H₂SO₄) and Nitric acid (HNO₃). The most use of laboratory equipment are in the muslim period.

3. MODERN PERIOD:

Modern period starts from 16th century. New elements, laws, theories and structure of an atom were discovered in this period by different scientists.

Q3. Write down the three significant reasons to studying chemistry?

There are three significant reasons to studying chemistry:

➤ 1st REASON:

Chemistry has important practical applications in the society. The development of life saving drugs is one and a complete list would touch upon most areas of modern technology.

➤ 2nd REASON:

Chemistry is an intellectual enterprise a way of explaining our material world.

➤ 3rd REASON:

Chemistry figures prominently in other fields such as Biology in the advancement of medicines. Chemistry in every field is a useful intellectual tool for making important decisions.

Q4. What is the role of chemistry in the society?

Or

Chemistry and human society “Go Hand in Hand”. Write four arguments in support of this statement.

CHEMISTRY AND SOCIETY:

Chemistry plays an important role in the modern world for example food synthetic fibers, plastics, medicines, soap, detergents, cosmetics, cement, fertilizers, glass, explosives and others are the major gifts of chemistry.

Chemistry is an extremely practical science and has deep influence on our daily living. It matters with the protection of environment providing our everyday needs of food, clothing and shelters. Using chemistry we have discovered pharmaceutical chemicals that enhance our health and prolong our lives.

Q5. What is scientific method? Also describe its steps.

SCIENTIFIC METHOD:

Science is not only a knowledge of physical and biological phenomenon but also the methodology through which this knowledge gathered. The process of scientific discoveries is a cyclic process. The scientific method include the following steps.

- i. Observation ii. Hypothesis iii. Theory iv. Scientific law

➤ **OBSERVATION:**

Observation is a basic tool to elaborate a phenomenon varies from person to person and depends on person's own skills and elaboration.

➤ **HYPOTHESIS:**

The explanation of observation of a particular phenomenon, which is still only a trial idea is called hypothesis.

➤ **THEORY:**

When the hypothesis is supported by a large amount of different types of observations and experiments, then it becomes a theory.

SCIENTIFIC LAW:

A theory which is tested again and again found to fit according to the facts and giving valued prediction called scientific law.

Q6. Write down the contribution of Muslim Scientists in the fields of chemistry.

➤ **JABIR IBN-E-HAYAN (721-803 A.D):**

- i. He invented experimental methods for the preparation of nitric acid, hydrochloric acid and white lead.
- ii. He developed methods for dyeing clothes.
- iii. He developed methods for extraction of metals from their ores.

➤ **AL RAZI (862-930 A.D):**

- i. He was an expert surgeon and was the first to use opium as an anaesthesia.
- ii. He divided the substances into living and non-living origins.
- iii. He prepared ethyl alcohol by fermentation process.

➤ **AL BERUNI (973-1048 A.D):**

- i. He contributed a lot in physics, mathematics, geography, metaphysics and history.
- ii. He determine the densities of different substances.
- iii. He first time measured the circumference of the earth.

Q7. Write down the names of the scientists of Modern Period and also write their contributions.

S.NO	NAME	CONTRIBUTION
01	Robert Boyle	He is known as the father of Modern chemistry. He was the first who put forward the idea that chemistry should be regarded as a systematic investigation of nature with the sole aim of promoting knowledge.
02	J-Black	He discovered Carbondioxide
03	J-Prieslly	He discovered Oxygen, Sulphurdioxide and hydrogen chloride gas.
04	Scheele	He discovered Chlorine gas.
05	Cavendish	He discovered hydrogen gas.
06	Lavoisior	He discovered that oxygen constituted about one fifth part of air.
07	Johan Dalton	He gave atomic theory of matter.
08	Gay lussac	They determine the relative atomic and molecular masses of many substances.
09	Avogadro	
10	Dulang	
11	Petit	
12	J.J Berzellius	He introduce the idea of symbols, formulae and chemical equations.
13	Mendeleeff	He made the Periodic table of elements.
14	Arrhenius	He made the ionic theory about acid and base.
15	M. Faraday	He gave the laws of electrolysis.
16	J.J Thomson	He discovered electrons.
17	Neil Bohr	He worked on structure of an atom.
18	H. Bacquerel	They worked on radioactive elements and radioactivity.
19	M. Curie	
20	Gold Stein	He discovered protons.
21	James Chadwick	He discovered neutrons.
22	Ernest Rutherford	He discovered nucleus of an atom.