CHAPTER-1

INTRODUCTION TO CHEMISTRY

Introduction:

Science is the systematic, ongoing effort by human beings to study, understand and utilise nature for the meaningful purposes. This understanding is slowly developed by careful observations and experiments.

Chemistry- A Branch of Science:

Science is broadly classified into three main branches.
(i) Physics (ii) Chemistry (iii) Biology

The branch of science that deals with the study of the composition and the physical and chemical properties of various forms of matter is called Chemistry.

Development of Chemistry-----A historical Perspective

ALCHEMY

Alchemy is an ancient practice, which played an important role in the development and growth of chemistry. The word Alchemy has its origin in a Greek word “Khemeia” which means “art of transmuting metals”. It was partly based on spiritual ad discipline. Alchemists were successful in extracting metals and making alloys

> Alloys are the homogenous mixture of two or more metals giving it a desired property. The iron pillar near Qutab Minar is an alloy of iron and phosphorous, that is rust resistant

Importance of Chemistry:

1) Food and agriculture: Chemistry has helped farmers by providing them with agro-chemicals like fertilisers, pesticides, insecticides, Fungicides and Preservatives.
    - ➤ Fertilisers: They are the chemicals which provide essential nutrients to crops and thus increases the yield. Some of the important fertilizers are Urea, Sodium nitrate, potash, ammonium phosphate and calcium nitrate etc.
    - ➤ Pesticides: They are the chemicals to kill the pests. Malathion, parathion and aldrin etc. are some of the

pesticides.

- Insecticides: Insecticides like D.D.T and B.H.C are used to kill the insects.
- Fungicides: These are the chemical that protect crops from the fungus. Examples of fungicides are Bordeaux mixture and Sulphur.
- Preservatives: These are used to preserve the food for a longer time, Sodium benzoate, Sodium meta-bisulphate are well known preservatives.

2) **Food processing and processed food:** Food processing is the transformation of the raw food materials by physical and chemical means into the marketable food products that can be served to the consumer. Examples-bread, jams, jelly etc.

3) **Minerals and Petroleum:** Knowledge gained through chemistry help in the extraction of metals from their ores. Petroleum products like petrol, diesel and wax etc. are separated from the crude oil with the help of chemical techniques.

4) **Industry:** The knowledge of chemistry enabled us to improve the efficiency of industrial processes to produce a large number of consumer products like dyes, paints, plastics, textiles, soap and detergents etc.

5) **Medicines:** Extensive researches by chemists have led to the discovery of a number of medicinal drugs. Examples: aspirin, paracetamol, antibiotics like penicillin, antiseptics etc. to kill germs and cure diseases.

6) **Cosmetics:** Cosmetics are the products used to cleanse, protect and change the appearance of external parts of human bodies. Examples: talcum powder, skincare, lotions, perfumes etc. are produced due to the knowledge of chemistry.

Talcum powder is made up of a mineral called talc which contains elements like magnesium, silicon and oxygen

7) **Clothing:** Manufacturing of clothing begins with the knowledge of conversion of fibres into fabrics. with more development synthetic fibres like nylon and terylene etc. are also made.

8) **Building Materials:** Basic raw materials such as cement, mortar, steel and varnishes etc. used for the construction purpose are also made due to the knowledge of chemistry.

9) **Communication Devices:** Synthetic chemicals, metallic wires and plastics used in telephones, mobile phones, radios etc. are all gifts of chemistry.

10) **National Defences:** Substances like gunpowder, T.N.T (trinitrotoluene), phosgene, chemical weapons etc. are all the products of chemistry.

11) **Recreation:** Chemistry plays a vital role in any mode of recreation. Sports goods are made from rubber, leather, plastics and fibres etc. Substances for photographic films are the gifts of chemistry.

12) **Chemistry and energy resources:** The energy resources of the world like petroleum, coal, wood and nuclear fuels are the gift of chemistry. Solar energy, ocean energy and biogas, which may provide inexhaustible sources of energy are being studied under chemistry.

DARK SIDE OF CHEMISTRY

Chemistry, misused by unscrupulous people, has also been endangering human society. It has given rise to the menace of harmful drugs and their bulk processing like LSD, cocaine, brown sugar, heroin etc. that cripple the society. Chemistry has also developed deadly explosives such as TNT, RDX and the hydrogen bombs etc.

These are the Jewels of Chemistry

CHEMISTS NAME	DISCOVERY
• Joseph Priestly • Daniel Rutherford • William Ramsay • Henry Cavendish	Oxygen Nitrogen Helium, Argon, Xenon Hydrogen

FULL FORM OF:-

TNT-Trinitro-toluene.

DDT-Dichloro-diphenyl trichloro ethane.

BHC-Benzene hexachloride.

LSD-Lysergic acid diethylamide

RDX-Rapid detonating explosive