

BIOLOGY

- ST045 Origin of Life
 - ST046 Insectivorous Plants
 - ST047 Spirogyra
 - ST048 Tape Worm
 - ST049 Hook Worm
 - ST050 Paramecium
 - ST051 Life Cycle of Fern
 - ST052 Fruits
 - ST053 Dispersal of Fruits and Seeds
 - ST054 Reproduction in Plants
 - ST055 Germination of Seed-Bean and Pea
 - ST056 Life Cycle of Butterfly
- Price Rs. 175.00 each

CHEMISTRY

- ST101 Chemical Reaction & its Characteristics
 - ST102 Separation of Substances
 - ST103 Chemical Reactivity of an Element
 - ST104 Occurrence and Forms of Carbon
 - ST105 Carbonates & Bicarbonates
 - ST106 Atmosphere & Composition of Air
 - ST107 Carbon Dioxide and Carbon Monoxide
 - ST108 Classification of Chemical Reactions
 - ST109 Atom and Atomic Structure
 - ST110 Blast Furnace
 - ST111 Aluminium Metallurgy
 - ST112 Different Kinds of Cells
- Price Rs. 175.00 each

Separation of Substances

Separation of substances is required to get a pure and clean substance for our use. Substances can be purified through various means. Some of them have been discussed below:

Distillation

Substance A with B is heated so that B is converted into vapour.

Fractional Distillation

Substance A with B and C is heated so that B and C are converted into vapour.

Leaching

Substance A with B is heated so that B is converted into vapour.

Filtration

Substance A with B is heated so that B is converted into vapour.

Incineration and Crystallisation

Substance A with B is heated so that B is converted into vapour.

Magnetic Separation

Substance A with B is heated so that B is converted into vapour.

Sedimentation and Decantation

Substance A with B is heated so that B is converted into vapour.

Striving

Substance A with B is heated so that B is converted into vapour.

Winnowing

Substance A with B is heated so that B is converted into vapour.

Sublimation

Substance A with B is heated so that B is converted into vapour.

Carbonates and Bicarbonates

Carbonates and bicarbonates are the salts of carbonic acid.

CARBONATES

Common Carbonate (CaCO₃)

Calcium carbonate is found in marble, limestone, chalk, etc.

BICARBONATES

SODIUM BICARBONATE (NaHCO₃)

Sodium bicarbonate is used in baking powder, etc.

Classification of Chemical Reactions

Combination Reaction

Two or more substances combine to form a single product.

Decomposition Reaction

A single substance breaks down into two or more products.

Displacement Reaction

A more reactive element displaces a less reactive element from its compound.

Double Displacement Reaction

Two compounds react to form two new compounds.

Redox Reaction

Reduction and oxidation occur simultaneously.

Exothermic Reaction

Heat is released during the reaction.

Endothermic Reaction

Heat is absorbed during the reaction.

BLAST FURNACE (EXTRACTION OF IRON)

The main aim of blast furnaces is to produce molten iron from iron ore.

The furnace is loaded with the charge consisting of iron ore, coke and limestone. The charge is heated to about 2000°C. The main reaction is:

$$\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$$

MANUFACTURE OF STEEL

The steel produced by the blast furnace is known as pig iron.

The pig iron is heated in a converter to remove carbon and other impurities.

Mole Concept

The mole is a unit for measuring the amount of substance.

1 mole = 6.022 x 10²³ particles

ELEMENT	ATOMIC MASS (amu)	MOLES IN 1 GRAM	MOLES IN 100 GRAMS
C	12	1/12	100/12
O	16	1/16	100/16
H	1	1	100

The number of units represented by the Avogadro Number, N_A, is 6.022 x 10²³.

1 MOLE	MOLECULAR MASS (amu)
H ₂	2.016
O ₂	32.0
Cl ₂	70.9
Al ₂	54.0

The mass of one mole of a substance is equal to its molecular mass in grams.

AVOGADRO'S HYPOTHESIS

Equal volumes of all gases, under the same conditions of temperature and pressure, contain the same number of molecules.

CHARGE ON AN ELECTRON

1 mole of electrons is 6.022 x 10²³ electrons and is called the Faraday (F) in electrical units and Faraday is equal to 96,500 coulombs of charge.