

# Glossary

**Abnormal molar mass:** The value of molar mass that is higher or lower than the true value.

**Absorption:** A bulk phenomenon in which the concentration of molecular species is uniformly distributed throughout the body of the solid or liquid.

**Actinoids:** The 15 metallic elements between actinium and lawrencium.

**Activated carbon:** An extremely porous carbon that has a very large surface area available for adsorption or chemical reactions.

**Activated complex:** An unstable intermediate complex formed by the collision of reactant molecules which ultimately breaks to form products.

**Activation energy:** The minimum energy required to form the activated complex.

**Active site of enzymes:** A site present on the enzyme which binds its specific substrate and hence forms enzyme–substrate complex.

**Addition polymerization:** A polymerization reaction in which monomers containing one or more double bonds are linked to each other without the elimination of any byproducts, usually in the presence of free radical initiator.

**Adsorbate:** The gas or solution which is adsorbed the surface.

**Adsorbent:** The solid or liquid on whose surface, gas or liquid is adsorbed.

**Adsorption:** The phenomenon of the assimilation of higher concentration of any species at the surface of a solid or liquid as compared to that present in the bulk of the material.

**Adsorption chromatography:** A technique used for the separation of compounds based on their selective adsorption on the surface of a suitable adsorbent.

**Adsorption isobar:** A curve showing variation of adsorption with temperature at constant pressure.

**Adsorption isotherm:** A curve showing the variation in of adsorption with pressure at constant temperature.

**Agonist:** The drug which binds to a receptor and mimics the effect of natural messenger thus helping in signal transmission.

**AIDS (acquired immuno deficiency syndrome):** A severe disease of immune system which is caused by special type of virus called as human immuno deficiency virus (HIV).

**Alcohols:** The compounds whose molecules have one or more hydroxyl groups attached to a carbon atom.

**Aldaric acids:** These are sugar acids where the terminal hydroxyl groups have been replaced by carboxylic acids.

**Aldehydes:** Compounds containing a carbonyl group (carbon double bonded to oxygen) bonded to hydrogen and an alkyl group.

**Aldol condensation:** An organic reaction in which an enolate ion reacts with a carbonyl compound to form a  $\beta$ -hydroxyaldehyde or  $\beta$ -hydroxyketone, followed by dehydration to give a conjugated enone.

**Aliphatic amines:** Amines in which all the carbon atoms bonded directly to nitrogen are derived from alkyl groups.

**Alkyl group:** A functional group which consists of single bonded carbon and hydrogen atoms.

**Alkyl halides:** The compounds in which a halogen atom replaces a hydrogen atom of an alkane.

**Alkylidene:** Divalent functional group derived from alkane by removal of two hydrogen atoms from the same carbon atom.

**Allosteric inhibition:** The inhibition in which the interaction of an enzyme molecule with a drug is at a site other than the active site.

**Allylic alcohols:** The compounds with carbon atom bonded to  $-OH$  is attached to carbon–carbon double bond.

**Allylic halides:** The compounds with halogen atom bonded to carbon atom next to a carbon–carbon double bond.

**Ambidentate ligands:** The ligands capable of ligating through two different atoms.

**Amides:** An organic compound containing the group  $CONH_2$ .

**Amines:** The derivatives of ammonia ( $NH_3$ ) in which one or more hydrogen atoms are replaced by alkyl or aryl groups.

**Amino acids:** These are compounds containing an amine group and a carboxylic group.  $\alpha$ -Amino acids are carboxylic acids that contain an amino ( $-NH_2$ ) group attached to C2 (the  $\alpha$ -carbon).

**Amorphous solids:** The solids that do not have a definite geometrical shape.

**Analgesics:** The drugs used to relieve pain.

**Analytical chemistry:** The study of separation, identification, and quantification of the chemical components of natural and artificial materials.

**Anionic complex:** A negatively charged complex ion.

**Anionic detergents:** The detergents having a negative ionic group and are sodium salts of sulphonated long-chain alcohols or hydrocarbons (e.g., sodium salts of alkylbenzene-sulphonates).

**Anisotropy:** The molecules exhibiting different values for physical properties when measured in different directions.

**Anode:** The electrode at which oxidation (loss of electrons) takes place during an electrochemical charge.

**Anomers:** Monosaccharides that differ in configuration only at anomeric carbon, that is the hemiacetal carbon of the cyclic form.

**Antacids:** The drugs which neutralize the acidity in stomach.

**Antagonists:** The drugs which bind to the receptor site and inhibit its natural function.

**Antibiotics:** The drugs that restrict the growth of microorganisms and prevent spread of infection.

**Anticatalyst:** A substance which deactivates the catalyst.

**Antiferromagnetic:** A substance with zero net magnetization since the adjacent dipoles point in opposite directions.

**Antifertility drugs:** The drugs capable of reducing or eliminating fertility and thereby helping in birth control.

**Antihistaminic drugs:** The drugs that inhibit action of histamine.

**Anti-Markovnikov addition:** An addition reaction in which the hydrogen atom is added to more substituted carbon atom of the double bond while the halogen (or any other group) is added to less substituted carbon. It generally takes place in presence of peroxides.

**Antimicrobials:** The substances that either kill microbes (microbiocidal) or prevent microbial growth (microbiostatic).

**Antiseptic:** The chemical substances that prevent the growth of microorganisms or kill them but are not harmful when applied to human tissues.

**Aprotic solvent:** A solvent that does not exchange protons with a substance dissolved in it.

**Aromatic amines:** Amines in which one or more of the groups bonded directly to nitrogen are aryl groups.

**Arrhenius theory:** The reactant molecules are first converted into a highly energized intermediate activated complex or transition state, which further breaks down into products.

**Artificial sweetening agents:** The chemical agents responsible for sweetening of edible food materials.

**Aryl halides:** The compounds with halogen attached to  $sp^2$  hybridized carbon atom of aromatic ring.

**Associated colloids:** The colloids in which the dispersed phase is made up of particles that behave as regular electrolytes at lower concentrations but aggregate at higher concentrations to form particles of colloidal dimension.

**Asymmetric carbon atom:** The carbon atom attached to four different functional groups or atoms.

**Azeotropic mixtures:** The liquid solutions of two (or more) components which have a composition that does not change on distillation.

**Azo dye:** These are compounds of the form  $Ar - N = N - Ar$  which are formed by azo coupling reaction and are commonly used as dyes.

**Bakelite:** A thermosetting phenol-formaldehyde resin made by a condensation reaction between phenol and formaldehyde; the reaction can be catalyzed by either acids or bases.

**Battery:** A combination of cells either in series or parallel or both, in which chemical energy is converted into electrical energy.

**Benefaction of ore:** A method for concentration of ore to separate out gangue and other impurities from the metal.

**Benzylic alcohols:** The compounds with carbon atom bonded to  $-OH$ , attached to an aromatic ring.

**Benzylic halides:** The compounds with halogen atom bonded to carbon atom attached to an aromatic ring.

**Bimolecular reactions:** The reactions which involve two molecular species as reactants.

**Binary solution:** A mixture of solute and solvent.

**Biocolloids:** The colloidal mixtures of plant and animal origin.

**Biopolymers:** The polymers such as polysaccharides (starch and cellulose), proteins, nucleic acids, etc. which can undergo natural degradation by the action of naturally occurring microorganisms, such as bacteria, fungi and algae.

**Blast furnace:** A metallurgical furnace used in the process of smelting to produce industrial metals, generally iron.

**Body-centered unit cell:** A unit cell where atoms are present at its corners and one at the center.

**Bond length:** The average distance between the nuclei of two bonded atoms.

**Branched-chain polymers:** The polymers contain molecules having a linear backbone with branches arising randomly from it. Branched-chain polymer is formed when a bifunctional monomer is mixed and polymerized with a little amount of trifunctional monomer.

**Bredig's arc method:** A method used for the preparation of colloids of metals such as gold, silver, copper, platinum, etc.

**Brownian movement:** The random motion of colloidal particles due to continuous bombardment of the dispersed particles by the dispersion medium.

**Calcination:** A process in which the concentrated ore is heated to a high temperature (just below its fusion temperature) in the absence of air (or limited supply of air) causing loss of moisture, reduction or oxidation, and the decomposition of carbonates and other compounds.

**Cannizzaro reaction:** A reaction involving disproportionation of aldehydes lacking  $\alpha$ -hydrogens in the presence of a strong base to form salt of an acid and a corresponding primary alcohol.

**Carbohydrates:** Polyhydroxy aldehydes and ketones or substances that hydrolyze to yield polyhydroxy aldehydes and ketones. General formula  $C_nH_{2n}O_n$ .

**Carbonyl group:** A group containing carbon-oxygen double bond,  $\text{>C=O}$ .

**Carboxylic acids:** The organic acids possessing at least one carboxyl group.

**Cast iron:** It is a purer form of iron obtained by re-melting pig iron. The two main alloying elements present are carbon (2.1 to 4 % by weight) and silicon (1 to 3 % by weight).

**Catalyst:** A substance which alters the rate of a chemical reaction without itself getting consumed in the reaction.

**Catalytic hydrogenation:** An process which involves addition of molecular hydrogen to a double bond in presence of a metal catalyst.

**Cathode:** The electrode at which reduction (gain of electrons) takes place during an electrochemical change.

**Cathodic protection:** It is process in which a structural metal, such as iron, is protected from corrosion by connecting it to a metal that has more negative reduction half-cell potential. The entire metal is then converted into a cathodic site where the corrosion does not take place.

**Cationic complex:** A positively charged complex ion.

**Cationic detergents:** The detergents having a long hydrocarbon chain and a positive charge. The active part of the molecule is the cation and these are generally quaternary ammonium salts.

**Cell potential:** The potential difference between the two electrodes. It corresponds to the maximum potential that a cell can generate.

**Cellulose:** A polysaccharide consisting of D-glucopyranoside units linked in (1 → 4) fashion in very long unbranched chains.

**Centered or non-primitive unit cell:** A unit cell where atoms (lattice points) are present not only at the corner of unit cells but also at some other positions.

**Central atom/ion:** The central cation that is surrounded and coordinately bonded to one or more neutral molecules or negatively charged ions in a definite geometric arrangement.

**Chelate complexes:** The complexes of polydentate ligands.

**Chemical kinetics:** The study of the speeds (or *rates*) of chemical reactions.

**Chemisorption:** A process involving chemical bond formation between adsorbate and adsorbent.

**Chemotherapy:** The branch of science which deals with the treatment of various diseases with suitable chemical substances.

**Chiral molecule:** A type of molecule that lacks an internal plane of symmetry and thus has a non-superimposable mirror image.

**Chloramphenicol:** A chlorine containing antibiotic, produced by soil organism, which is used for treating typhoid.

**Chromatography:** A method of separating a mixture of components into individual components by equilibrium distribution between the two phases.

**Chromosomes:** The coiled structures of DNA and protein which contain genes and other regulatory elements responsible for transfer of hereditary information.

**Cis isomers:** The stereo isomer in which the two groups lie on the same side of reference plane (double bond).

**Cleansing agents:** The substances used to remove dirt, stain, bad odor from the surface.

**Clemmensen reduction:** A reaction involving reduction of aldehydes and ketones to the corresponding hydrocarbons with amalgamated zinc and concentrated hydrochloric acid.

**Coagulation:** A process of setting of colloidal particles due to neutralization of charge leading to aggregation of the particles.

**Coinage metals:** A group of three malleable ductile transition metals, that is copper (Cu), silver (Ag) and gold (Au).

**Colligative properties:** The properties that depend only on the number of solute particles in a solution, but are independent of the nature of those particles.

**Collision theory:** A theory stating that the rate of a reaction is proportional to the number of effective collisions per second among the reactant molecules.

**Colloid:** A dispersion in which the dispersed particles are larger than the solute ions or molecules of a true solution and smaller than the particles of a mechanical suspension.

**Competitive inhibitors:** The drugs in which enzyme inhibitor (drug) and substrate compete for the same active site and prevent the substrate from binding to the enzyme.

**Complex reactions:** The reactions that involve more than one step.

**Concentrated solution:** A solution with relatively large amount of dissolved solute.

**Concerted reactions:** The reactions in which bond breakage and formation occurs in one single step.

**Condensation polymers:** The polymers formed by intermolecular condensation reaction by the functional groups of monomers with continuous elimination of byproducts.

**Conductors:** The substances that allow the passage of current through them.

**Consecutive reactions:** These are reactions that take place in a series of steps.

**Coordination compounds:** A special class of compounds that consist of a central metal atom or ion, which is surrounded by oppositely charged ions or neutral molecules in more than its normal valence.

**Coordination entity:** The central metal atom or ion which is bonded to a definite number of ions or molecules which is fixed.

**Coordination isomerism:** Occurs in those complexes which have both anionic as well as cationic entities and there is a difference in the distribution of ligands within these entities.

**Coordination number:** The total number of ligands coordinately bonded to the central metal atom or ion.

**Coordination polyhedron:** The spatial arrangement of the ligand atoms that are directly attached to the central atom/ion.

**Coordination sphere:** This is represented by the central metal ion and the ligands coordinately bonded to it. It does not lose its identity and is non-ionizable.

**Copolymerization:** The polymerization of two or more different monomers resulting in the formation of a polymer containing both monomers linked in one chain.

**Corrosion:** The deterioration of materials by chemical interaction with their environment.

**Counter ions:** These are ions that are not part of the coordination sphere. They balance the charge on a cationic or anionic complex ion.

**Covalent network solids:** The solids in which the atoms or chemical subunits are bonded by conventional covalent bonds in a continuous network.

**Critical micelle concentration (CMC):** The concentration above which micelle formation takes place.

**Crossed-aldol reaction:** An aldol reaction that starts with two different carbonyl compounds.

**Cross-linked or network polymers:** A cross-linked three-dimensional network of polymer formed when the functionality of monomer is three and above.

**Crystal field splitting (stabilization) energy:** The difference in energy between the two sets of *d* orbitals in an octahedral or tetrahedral complex ion.

**Crystal field theory:** A theory that considers the effects of the polarities or the charges of the ligands in a complex ion on the energies of the *d* orbitals of the central metal ion.

**Crystal lattice:** Three-dimensional arrangement of atom.

**Crystalline solids:** The solids with large number of crystals each of which have well-defined regular shape.

**Curtius rearrangement:** A reaction used for the conversion of a carboxylic acid into primary amine containing one carbon atom less than the parent acid.

**Cyanide process:** A process in which metal is leached into aqueous solution using  $CN^-$  ions during the extraction of gold and silver.

**DDT (dichlorodiphenyltrichloroethane):** An organochloro pesticide with insecticidal properties which is harmful for both humans and animals.

**Decarboxylation:** The reaction whereby a carboxylic acid loses  $CO_2$  and forms hydrocarbons.

**Decyl alcohol:** Alcohol with ten carbon chains.

**Degree of polymerization (DP):** The number of repeating units present in a polymer.

**Dehydrohalogenation:** A method for synthesizing alkenes by elimination of elements of a hydrogen halide from a haloalkane.

**Denaturation of protein:** Any change in protein conformation caused by disruption of the non-covalent forces and disulphide bonds responsible for maintaining secondary, tertiary and quaternary structures.

**Denticity:** The number of times a ligand bonds to a central metal ion through non-contiguous donor sites.

**Deoxyribonucleic acid (DNA):** A polynucleotide structure with sugar phosphate backbone joined together by ester bonds.

**Desorption:** The process of removal of an adsorbed substance from the surface.

**Dextrorotatory:** A substance that rotates plane-polarized light in the clockwise direction (to the right).

**Dialysis:** A process involving removal of dissolved solute from colloidal dispersion through the use of parchment membrane.

**Diamagnetic:** A substance which is not attracted to magnetic field because of absence of unpaired electrons.

**Diastereomers:** The stereoisomers which are not the mirror images of one another and are non-superimposable.

**Diazo coupling reaction:** An electrophilic aromatic substitution reaction in which arenediazonium ions react with highly reactive aromatic compounds to yield azo compounds.

**Diazotization:** A reaction in which primary aliphatic/aromatic amine reacts with nitrous acid to yield highly unstable aliphatic/aromatic diazonium salts.

**Didentate ligands:** The ligands capable of binding to the central metal ion through two binding sites.

**Diisobutylaluminium hydride:** A reagent used to reduce esters and nitriles to aldehydes.

**Dilute solution:** A solution that contains a relatively small amount of dissolved solute.

**Dipeptide:** The protein containing two amino acid groups.

**Dipole-dipole interactions:** The interactions in which polar molecules attract each other because of presence of permanent dipole resulting in elevation of boiling points.

**Disaccharides:** The carbohydrates that undergo hydrolysis to produce only 2 molecules of monosaccharides.

**Discharging of battery:** A process in which spontaneous redox reaction occurs due to migration of electrons liberated at the anode towards the cathode through an external wire.

**Disinfectant:** The chemical substances applied to non-living objects to kill the microorganisms present on them.

**Dissolution:** A process in which surface ions become hydrated and slowly diffuse away from crystal, dissolving in water.

**Donor atom:** The coordinating atom of the ligand which is actually donating electron pair to the central metal ion.

**Double salts:** The salts which lose their identity in solution. They also contain more than one cation or anion.

**Dow process:** A process used for the preparation of phenols from haloarenes by hydrolysis of chlorobenzene.

**Drug:** A chemical substance used for the prevention or cure of any type of disease.

**Effective atomic number (EAN):** The total number of electrons neighboring the nucleus of a metal atom in a coordination complex. It is composed of the metal atom's electrons and the bonding electrons from the surrounding ligands.

**Elastomers:** The polymers which undergo very long elongation when pulled apart, and return to their original length on release. These are usually coiled and long-chained polymers.

**Electrical resistance:** The resistance to the flow of electric current.

**Electrochemical cells:** The devices which convert electrical energy into chemical energy or *vice versa*.

**Electrode potential:** The potential difference that develops between the electrode and the electrolyte.

**Electrodes:** A cathode or anode inside an electric cell.

**Electrodialysis:** A process of dialysis in which an electric field is applied.

**Electrokinetic potential:** The potential difference between the two layers of charges around the colloidal particles.

The first layer of charge is held on to the colloidal surface while second is diffused.

**Electrolysis:** A process in which an electric current is passed through an ion containing solution.

**Electrolytic cells:** The devices in which physical or chemical changes occur in the presence of applied electrical energy.

**Electrolytic conductors:** The substances which conduct electricity both in the fused state and in the aqueous solution.

**Electrolytic reduction:** The reduction of molten metal salts or metals existing as ions in solution carried out by electrolysis or addition of some reducing agent.

**Electrolytic refining:** A process involving purification of metals in the presence of electrolyte which is aqueous solution of salt of the metal and cathode which is strip of pure metal.

**Electromotive force (emf):** The potential generated by a galvanic cell, when no current is drawn through the cell.

**Electronegativity:** The tendency of an atom to attract electrons for the formation of ionic bonds.

**Electro-osmosis:** The migration of dispersion medium (solvent) under the effect of electric field.

**Electrophilic aromatic substitution:** A reaction in which the hydrogen atom of an aromatic ring is replaced.

**Electrophoresis:** A phenomenon involving migration of colloidal particles towards the oppositely charged electrodes under the influence of applied electrical potential.

**Electroplating:** The process of a thin layer of metal onto a (cathodic) surface by electrolysis.

**Elementary reactions:** These are coating reactions that proceed in a single step.

**Elimination reactions:** The reactions in which fragments of some molecule are removed (eliminated) from adjacent atoms of the reactant.

**Ellingham diagram:** A graph showing change in standard Gibbs energy with respect to temperature for various reactions such as the formation of oxides, sulphides, etc.

**Emulsifying agents:** The substances which are added during the preparation of the emulsions to stabilize them.

**Emulsion:** A mixture of two immiscible or partially miscible liquids that are shaken together to form a liquid-liquid dispersion.

**Enamines:** A compound formed by reaction of aldehyde and ketone with secondary amines with loss of water. Nitrogen is directly bonded to carbon-carbon double bond.

**Enantiomers:** Stereoisomers that are non-superimposable mirror images of each other.

**End-centered unit cell:** A unit cell where atoms are present at the center of diagonal joining the nearest neighbors at one set of faces in addition to the atoms at the corners of the unit cell.

**Enolate anion:** An intermediate anion formed because of deprotonation of keto or enol tautomers.

**Enols:** The compounds in which a hydroxyl group is attached to an unsaturated carbon atom of a double bond.

**Enthalpy of atomization:** The change in enthalpy that occurs when one mole of a compound is converted into gaseous atoms.

**Enzyme:** These are biological compounds (proteins) responsible for catalyzing the chemical reactions taking place in living cells.

**Enzyme inhibitors:** The substances inhibiting the activity of drugs by either blocking the active site or by inhibiting the catalytic activity of the enzyme.

**Equivalent conductance:** The conductance of an electrolytic solution due to all the ions obtained from 1 gram-equivalent (g-equiv.) mass of the electrolyte at a given concentration.

**Esterification of carboxylic acids:** The condensation reaction of carboxylic acids with alcohols or phenols to form esters in the presence of a mineral acid.

**Etard reaction:** A reaction involving oxidation of toluene with chromyl chloride ( $\text{CrO}_2\text{Cl}_2$ ) in  $\text{CCl}_4$  or  $\text{CS}_2$  to give benzaldehyde.

**Ethers:** The compounds in which the hydrogen atom of a hydrocarbon is replaced by an alkoxy or aryloxy group.

**Face-centered unit cell:** A unit cell where atoms are present at the corners and at the center of each face of the unit cell.

**Facial isomer (fac):** An isomer of octahedral complex in which the two sets of ligands occupy the face of an octahedron.

**Fehling's test:** A distinguishing test between aldehyde and ketone where presence of aldehyde is indicated by the formation of reddish brown precipitate.

**Ferromagnetic:** The substance which is strongly attracted by applied magnetic field and can be permanently magnetized.

**Fibers:** The long, thin and thread-like polymers, whose length is at least 100 times their diameter and which do not undergo stretching and deformation like elastomers but have high tensile strength and Young's modulus.

**Fibrous protein:** The protein with rod- or wire-like shape, stabilized by hydrogen and disulphide bonds.

**Finkelstein reaction:** The reaction by which alkyl iodides can be prepared by reacting alkyl chloride or bromide with sodium iodide in dry acetone.

**First-order reactions:** The reactions whose rate is determined by the change of only one concentration term.

**Fischer projections:** Diagrammatic representation of a three dimensional structure in two dimensions.

**Fittig reaction:** The reaction between two molecules of an aryl halide with sodium in the presence of dry ether to form a diaryl.

**Flux:** The impurity that is externally added to remove the impurity already present in the ore.

**Foam:** A gas suspended in a liquid or a solid.

**Food additives:** The substances added to food to preserve its flavor and enhance its taste and appearance.

**Food preservatives:** The substances which increase the shelf life of foods by stopping or slowing down the spoilage caused by microbes.

**Formaldehyde:** A most common aldehyde molecule used in the preservation of specimens and in manufacture of polymers.

**Free radical:** An atomic or molecular species having an odd or unpaired electron. It is a highly active species.

**Freezing point depression:** The difference in the freezing point of a solution containing a non-volatile solute and the freezing point of the pure solvent.

**Frenkel defects:** The defects in which an ion is displaced from its regular position to an interstitial position, creating a vacancy.

**Freundlich adsorption isotherm:** An equation giving the empirical expression which represents the relationship between extent of adsorption and pressure at a constant temperature.

**Friedel–Crafts acylation:** A reaction in which an acyl group is introduced into an aromatic ring.

**Froth floatation method:** The method used for separating gangue from sulphide ores.

**Froth stabilizers:** The reagents used to stabilize the froth.

**Fuel cells:** The galvanic cells in which the electrical energy is directly derived from the redox reactions of the fuel.

**Functionality:** The total number of bonding sites or functional groups present in a monomer molecule.

**Furanose structure:** The structure of carbohydrates possessing five-membered ring system which includes four carbon atoms and one oxygen atom.

**Gabriel phthalimide synthesis:** A method for preparing primary amines, that restricts formation of secondary and tertiary amines, using potassium phthalimide.

**Galvanic cells:** The devices in which electrical energy is generated on account of the chemical reactions occurring in them.

**Gangue:** The impurities present within the ore.

**Gattermann reaction:** The reaction in which benzenediazonium chloride is treated with copper powder and a halogen acid to form aryl halide.

**Gattermann–Koch reaction:** A reaction which involves introduction of aldehyde group into benzene ring.

**Genes:** The sequences of DNA or RNA that are responsible for transfer of genetic information from one generation to another.

**Geometric isomerism:** Occurs in disubstituted (heteroleptic) complexes with coordination numbers 4 and 6 having square planar and octahedral geometries, respectively.

**Germicidal:** The chemical that kills germs or pathogenic microorganisms.

**Gibbs energy:** The capacity of a thermodynamic system to do work.

**Globular protein:** The protein which is spherical in shape, highly folded and tends to be water soluble.

**Glucan:** A homopolysaccharide consisting of glucose monomeric units.

**Glycogen:** A polysaccharide which is primarily responsible for storage of glucose in animal and human cells.

**Goiter:** The swelling of the thyroid gland caused due to iodine deficiency.

**Gold number:** The minimum number of milligrams of a protective colloid which just prevents the change in color of 10 ml of a red gold sol when 1 ml of a 10% solution of sodium chloride is added to it.

**Gomberg–Bachmann reaction:** A reaction in which diazonium salt reacts with aromatic compound in presence of aqueous alkali to yield biaryls.

**Gravity separation:** A technique that utilizes the density difference between the ore and impurity for concentrating the ore.

**Haematite:** The mineral form of iron oxide used as an ore of iron.

**Half-cell:** It is one of the two electrodes of a galvanic cell or simple battery, immersed in a solution of electrolyte which is separated by a naturally occurring Helmholtz double layer.

**Hydrogen electrode:** A commonly used reference electrode.

**Half-life of a reactant:** The amount of time required for half of the reactants to disappear.

**Halogenation reaction:** A reaction that involves a halogen addition or substitution of a halogen to hydrocarbons.

**Haworth structure:** A representation of cyclic structure of monosaccharide in a three-dimensional form.

**Hell–Volhard–Zelinsky (HVZ) reaction:** A reaction of an aliphatic carboxylic acid containing  $\alpha$ -hydrogen with  $\text{Cl}_2$  or  $\text{Br}_2$  in presence of a small amount of red phosphorus to give  $\alpha$ -haloacid.

**Hemiacetals:** A compound containing a hydroxyl group and an alkoxy group connected to the same carbon.

**Henry's law:** A law that states that the concentration of a gas dissolved in a given volume in a liquid at any given temperature is directly proportional to the partial pressure of the gas over the solution.

**Heterogeneous catalyst reaction:** A reaction in which the phase (solid, liquid or gas) of the catalyst differs from that of the reactants.

**Heteropolysaccharide:** A polymer made up of more than one type of monosaccharide.

**Hinsberg test:** A test to distinguish between primary, secondary and tertiary amines.

**Histamine:** A nitrogen containing organic compound involved in immune response, function of digestive tract and in inflammatory response.

**Hofmann degradation:** A method for preparation of amines which involves reaction of amide (with no substituent on nitrogen) with solution of bromine or chlorine in sodium hydroxide.

**Homopolymers:** The polymers formed from the same type of monomers.

**Linear polymers:** The polymers in which the molecules form long chains without branches or cross-linked structures.

**Homopolysaccharide:** A polymer made up of single monosaccharide unit.

**Hunsdiecker reaction:** A reaction involving decomposition of the silver salt of a carboxylic acid with  $\text{Br}_2$  in refluxing  $\text{CCl}_4$  to form an alkyl or aryl bromide with one carbon less than the original acid.

**Hydration isomerism:** The solvent molecule can act as the ligand which may or may not be directly bonded to the metal ion or is present as free solvent molecule in the crystal lattice.

**Hydroboration oxidation:** A reaction that converts an alkene into neutral alcohol by addition of borane followed by oxidation.

**Hydrocarbons:** The compounds composed only of hydrogen and carbon.

**Hydrogen–oxygen fuel cell:** A fuel cell which combines hydrogen and oxygen to produce electricity, heat and water.

**Hypertonic solution:** A solution that has higher osmotic pressure or more solutes than another solution to which it is compared.

**Hypotonic solution:** A solution that has lower osmotic pressure or less solutes than another solution to which it is compared.

**Ideal solutions:** The solutions which obey Raoult's law for entire composition range.

**Imine:** A molecule containing a carbon–nitrogen double bond.

**Impurity defects:** The defects created in ionic crystals by adding impurities in which the ions are in different valence state than the constituent ions of the crystal.

**Induced fit:** The conformational changes produced in enzyme after the formation of enzyme–substrate complex that allows it to bind the substrate more efficiently.

**Inductive effect:** An electronic effect due to the polarization of  $\sigma$  bonds within a molecule or ion.

**Inhibitors:** These are substances which slow down the chemical reaction.

**Inner transition metals:** The elements whose atoms or ions have valence electrons in  $f$  orbitals.

**Instantaneous rate:** The rate at which the reactant is being consumed at any particular moment.

**Insulators:** The materials which have low conductivity and high resistivity.

**Interstitial compound:** A compound of transition metal whose atom of extremely small radius fits itself into interstitial spaces in a metal lattice.

**Interstitial defects:** The defects in which some constituent particles (atoms or molecules) occupy interstitial sites in the crystal.

**Invert sugar:** A mixture of sugar possessing equal amount of both dextrose and fructose in water.

**Iodoform reaction:** A test to distinguish between different types of alcohols where the compound is treated with halogen (preferably iodine) and alkali, forming yellow precipitate of iodoform.

**Ionic solids:** The solids in which the constituent particles are ions.

**Ionization enthalpy:** The energy required to remove an electron from its atom in the gaseous state.

**Ionization isomerism:** Occurs in complexes which have the same molecular formula but give different ions in solution on ionization.

**Isomers:** The compounds with same chemical formula but different structural arrangement of atoms.

**Isotropic substances:** The substances which exhibit the same values of any physical property in all directions.

**Kekulé structure:** A molecular structure of a cyclic conjugated compound that is depicted with alternating single and double bonds.

**Ketones:** The compounds which have only alkyl or aryl groups bonded to the carbonyl group.

**Kohlrausch law:** A law that states that the limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte.

**Kolbe's reaction:** A carboxylation reaction in which sodium phenoxide is allowed to heat with carbon dioxide and then treated with sulphuric acid to form salicylic acid or aspirin.

**Kraft temperature ( $T_k$ ):** The temperature above which micelle formation takes place.

**Laevorotatory:** A substance that rotates plane-polarized light in a counterclockwise direction.

**Lanthanoid contraction:** A decrease in ionic radii of the elements in lanthanoid series from cerium to lutetium which results in the subsequent elements having smaller than expected ionic radii.

**Lanthanoids:** The series of 15 metallic elements from lanthanum to lutetium in the periodic table in which the  $4f$  orbitals are successively filled.

**Lattice energy:** Energy released when one mole of a crystal is formed from gaseous ions.

**Lattice parameters:** The parameters used to define the size of unit cell.

**Leaching:** A process by which the metal component or impurities are dissolved out from the ore by using a suitable reagent.

**Lead acid battery:** A battery which consists of lead grid filled with spongy lead which acts as the anode and a lead grid packed with lead oxide acting as cathode.

**Leclanche cell:** A dry cell battery which contains a paste of ammonium chloride and zinc chloride as electrolyte.

**Lewis acid:** An electron pair acceptor.

**Lewis base:** An electron pair donor.

**Ligands:** An atom, ion or molecule that binds to a central metal ion to form a coordination complex by donation of one or more electrons to the central metal atom.

**Limiting molar conductivity:** The value obtained when the molar conductance of the solution reaches the maximum.

**Line defects:** These are groups of atoms in irregular positions.

**Linkage isomerism:** Arises due to presence of ligands with two different donor atoms, which may thus attach to the central metal atom through either of the two atoms.

**Lipids:** The fatty acid compounds which are insoluble in water but soluble in organic solvents.

**Lucas test:** A test to distinguish between primary, secondary and tertiary alcohols by reacting with hydrogen halides.

**Lyophilic colloids:** The colloidal solutions in which the dispersed particles have strong affinity for the dispersion medium.

**Lyophobic colloids:** The colloidal solutions in which the dispersed phase has weak interaction with the dispersion medium.

**Magnetic moment:** The quantity that determines the force which a magnet can exert on electric currents and the torque that a magnetic field will exert on it.

**Magnetic separation:** A method used to separate either magnetic ore from non-magnetic impurities or the magnetic impurities from the non-magnetic ore.

**Markovnikov's rule:** A rule stating that in the addition of a hydrogen halide to an alkene, the acid hydrogen (H) becomes attached to the carbon with fewer alkyl substituents, and the halide (X) group becomes attached to the carbon with more alkyl substituents.

**Mass percentage:** A method of expressing the concentration of solution as the percent of solute in a given mass of solution.

**Meisenheimer complex:** The carbanion with delocalized electrons formed from addition-elimination mechanism.

**Melamine-formaldehyde (MF) polymer:** A mixture of water-soluble methylol melamines produced when melamine reacts with neutralized formaldehyde at about 80–100 °C.

**Mercury cell:** A primary cell which consists of zinc powder as anode, mercuric oxide as cathode and a paste of zinc oxide and potassium hydroxide as electrolyte.

**Meridional isomer (mer):** An isomer of an octahedral complex in which the donor atoms of each set of identical ligands are coplanar.

**Metal carbonyls:** The coordination complexes of transition metals with carbon monoxide ligand.

**Metal toxicity:** The medical condition caused by increased levels of the heavy metal in the body.

**Metallic conductors:** The conductors in which conduction is only due to the presence of free mobile electrons.

**Metallic solids:** The solids having the property of a metal composed of positively charged metal cations in a three-dimensional array and delocalized electrons.

**Metallurgy:** The branch of science that deals with the properties, production and purification of metal.

**Minerals:** The compounds of metals which are naturally available in the earth's crust and can be obtained by mining.

**Misawite:** A compound of iron, oxygen and hydrogen which protects the cast iron pillar from rust.

**Molality:** The number of moles of solute dissolved per kilogram of solvent.

**Molar conductivity:** The conductance of an electrolytic solution due to all the ions obtained from 1 mol of electrolyte at a given concentration.

**Molarity:** The number of moles of solute dissolved per unit volume of solution.

**Mole fraction:** The mole fraction  $x_A$  of a substance A is given by

$$x_A = \frac{n_A}{n_A + n_B + n_C + n_D + \dots + n_Z}$$

where  $n_A, n_B, \dots$  are the number of moles of the components A, B, ...

**Molecular solids:** The solids in which the molecules are held together by van der Waals forces and have relatively low melting point.

**Molecularity of reaction:** The number of atoms or molecules which take part in an elementary reaction.

**Monomers:** The simple molecules which combine with each other to form polymers.

**Mononuclear coordination entities:** The entities containing a single central metal atom whose formula is a concise representation of the constituent central atom and all elements/groups coordinated with it in primary and secondary valences.

**Monosaccharide:** The simplest carbohydrate that cannot be hydrolyzed further into simpler carbohydrates.

**Multimolecular colloids:** The colloids in which the particles (atoms or small molecules) of the dispersed phase aggregate to form particles of colloidal size (diameter < 1 nm).

**Narcotic analgesics:** The drugs that relieve severe pain but also affect the central nervous system.

**Natural polymers:** The polymers obtained from natural sources such as plants and animals.

**Natural rubber:** An elastomer derived from the milky juice (latex) which forms a colloidal dispersion of rubber in water, obtained from *Hevea* rubber trees or other sources like gutta-percha and balata.

**Negative adsorption:** A process in which the solvent is taken up by the adsorbent.

**Nernst equation:** A quantitative equation which relates the electrode potential with concentration and temperature.

**Non-covalent bonding:** The bonding present between macromolecules which is electrostatic and hydrophobic in nature.

**Non-narcotic analgesics:** The drugs that relieve mild pain but do not affect the central nervous system.

**Non-reducing sugars:** The sugars which are unable to reduce the oxidizing agents.

**Non-volatile liquids:** The liquids that do not evaporate easily.

**Non-polar molecular solids:** The molecules formed by non-polar covalent bonds.

**Normality:** The number of gram-equivalent weight of the substance dissolved per liter of solution.

**Novalac resin:** Low molecular weight phenol-formaldehyde polymer obtained when the molar ratio of formaldehyde to phenol is less than one.

**Nucleic acids:** The biologically essential macromolecules including both DNA and RNA. They are long chain polymers of nucleotides.

**Nucleophile:** The species with an unshared electron pair. It is rich in electrons and seeks electron-deficient sites in organic molecules.

**Nucleophilic substitution reaction:** A reaction in which a nucleophile (electron donor) attacks the partial positive charge of an atom attached to a leaving group (electrophile).

**Nucleoside:** A compound formed by removal of the phosphate group of a nucleotide.

**Nucleotides:** The molecules responsible for the formation of structural units of DNA and RNA.

**Nylon 6,6:** One of the most important nylons, prepared from the six-carbon dicarboxylic acid, adipic acid and the six-carbon diamine, hexamethylenediamine (hexane-1,6-diamine) by heating them at 553 K under high pressure.

**Nylon:** A thermoplastic silky material which is a designation for family of synthetic polymers.

**Nylon-6:** A compound prepared by a ring-opening polymerization of  $\epsilon$ -caprolactam in the presence of water at 533–543 K.

**Octahedral complex:** A complex wherein six atoms or groups of atoms or ligands are symmetrically arranged around a central atom.

**Oligosaccharides:** The carbohydrates that hydrolyze to yield 2–10 molecules of monosaccharides.

**Optically active compounds:** The compounds which have the ability to rotate the plane of polarized light. The phenomenon is called optical isomerism.

**Order of reaction:** The power (exponent) of the concentration of reactant to which the rate of the reaction is directly proportional.

**Ores:** The minerals from which a metal can be extracted economically and conveniently.

**Organolithium compounds:** The compounds prepared by the reduction of organic halides with lithium metal.

**Osmosis:** The tendency of a solvent to move through a thin porous membrane from a dilute solution to a more concentrated solution.

**Osmotic pressure:** The extra pressure required to establish equilibrium in the amount of solutes between solutions that are separated by semi permeable membrane.

**Oxidation potential:** The measure of tendency of the oxidation that occurs at the electrode at equilibrium.

**Oxymercuration–demercuration:** A reaction in which alkenes react with mercuric acetate in a mixture of water and tetrahydrofuran (THF) to produce (hydroxyalkyl) mercury compounds.

**Ozonolysis:** A reaction involving cleavage of alkene or alkyne by ozone to form aldehydes and ketones.

**Packing efficiency:** The fraction of total volume of the unit cell which is actually occupied by atoms.

**Parallel reactions:** The reactions leading to the formation of some byproducts along with the main product.

**Pseudo–first–order reaction:** A reaction whose order is different from the actual due to large excess concentration of one of the reactants.

**Paramagnetic:** The substances which are weakly attracted by poles of magnetic field and do not possess permanent magnetism.

**Penultimate shell:** The second last shell.

**Peptide bond:** The amide linkage formed between two molecules when the carboxyl group ( $-\text{COOH}$ ) of one molecule reacts with the amino group ( $-\text{NH}_2$ ) of the other molecule.

**Peptization:** A process wherein a freshly generated precipitate is converted into a colloidal sol by shaking it in dispersion medium in the presence of an electrolyte.

**Pharmacophore:** The drug possessing a specific three-dimensional arrangement of functional groups.

**Phenols:** The compounds which have a hydroxyl group directly attached to a benzene ring.

**Physisorption:** A process involving van der Waals forces of interaction between gas or liquid molecules and solid surface.

**Pig iron:** The iron obtained from blast furnace.

**Point defects:** The points in a solid where an atom is missing or is irregularly placed in the lattice structure.

**Polar molecular solids:** The solids with covalent molecules possessing polar dipole moment and which can form molecular solids when cooled.

**Polarimeter:** An instrument used to measure the angle of rotation caused by passing polarized light through an optically active substance.

**Polyacrylonitrile (PAN):** A fibrous, rubbery organic polymer, which is a copolymer made from mixtures of monomers with acrylonitrile as the main component.

**Polyamides:** The polymers possessing an amide linkage and prepared by condensation polymerization of dicarboxylic acids with diamines or amino acids with their lactams as in nylon-6,6 and nylon-6, respectively.

**Polycrystalline solids:** The solids having a structure that falls between the two extremes of amorphous and crystalline solids.

**Polydentate ligands:** Tridentate, tetradentate, pentadentate, hexadentate and all types of ligands that bind to the metal ion through multiple bonding sites. The most important example of this type includes the hexadentate ligand.

**Polyesters:** A polymer composed of ester functional group in its main chain and are formed from condensation of dicarboxylic acids and diols.

**Polyethylene:** A thermoplastic polymer consisting of long chains produced by combining the ingredient monomer ethylene (IUPAC name, ethene), the name comes from the ingredient and not the actual chemical resulting.

**Polyhaloalkanes:** The alkanes in which one or more of the hydrogen atom is replaced by a halogen atom.

**Polyhalogen compounds:** The carbon compounds containing more than one halogen atom.

**Polyhydroxy alcohols:** The alcohols which have more than one –OH group per molecule.

**Polymer:** A macromolecule with high molecular mass formed by the repeated unit of several simple molecules linked together through covalent bonds called monomers.

**Polymerization:** The process of conversion of substances having low molecular weight (monomers) into substances having high molecular weight (polymers) with or without the elimination of byproducts.

**Polysaccharides:** The carbohydrates that yield a large number of molecules of monosaccharides (> 10) hydrolysis.

**Polytetrafluoroethene (Teflon):** A synthetic fluoropolymer of tetrafluoroethylene used for insulation of motors, generators, transformers, coils, capacitors, wires and cables.

**Positive adsorption:** A process in which the solute is adsorbed by an adsorbent.

**Primary alcohol:** The alcohol which has the hydroxyl group bonded to the carbon which has only one other carbon attached to it.

**Primary alkyl halides:** The compounds with carbon atom bearing the halogen atom attached to not more than one other carbon atom.

**Primary cells:** The cells in which chemical energy is converted into electrical energy as long as the chemical components are active.

**Primary structure of protein:** The sequence of amino acid residues in a polypeptide or protein.

**Primary valence:** The number of anions neutralizing the charge on the complex ion.

**Primitive unit cell:** A unit cell with atoms present only at its corners.

**Prodrugs:** The pharmacologically inactive compounds that are converted in the body to active compounds.

**Progesterone:** A hormone that prepares the uterus for nurturing a fertilized egg during pregnancy.

**Promoters:** The substances which are required in small quantities to activate the catalyst.

**Protective coatings:** The coatings which prevent corrosion at the surfaces of materials.

**Proteins:** The polymers of amino acids with molar masses ranging up to more than 50 million.

**Pseudo solids:** The solids having the tendency to flow like liquid.

**Pyranose structure:** The structure of carbohydrates possessing six membered ring which includes five carbon atoms and one oxygen atom.

**Pyrometallurgy:** The extraction and refining of metals from their ores based on physical and chemical changes occurring at high temperature.

**Quartz:** A hard white or colorless mineral consisting of silicon dioxide and can exist in both amorphous and crystalline form.

**Quaternary structure of protein:** The overall structure of a protein arising from the spatial arrangement of these subunits with respect to each other.

**Racemic mixture:** An equimolar mixture of enantiomers (i.e., 1:1 mixture of dextro and laevo isomers).

**Radioactive decay:** The disintegration of nucleus of an unstable atom along with the emission of ionizing radiation.

**Radioactive isotope:** An artificially created isotope of a chemical element having an unstable nucleus that decays, emitting alpha, beta, or gamma rays until stability is reached.

**Rate constant:** The rate of reaction when the molar concentration of each reactant is taken as unity.

**Rate law:** The mathematical expression that relates the rate of reaction to the concentration of either reactants or products.

**Rate of chemical reaction:** The rate of formation of one or more of the products in a chemical reaction.

**Reacting fraction:** The sum of all those fractions of the total collisions which equal or exceed the activation energy.

**Reaction coordinate:** Represents the extent to which the reactants have changed to the products.

**Reaction mechanism:** The series of individual steps that add up to the overall observed reaction.

**Receptors:** The protein molecules present on the surface of cell which receive chemical signal from neighbouring cells or nearby cellular environment and sends these signals to nerve cell.

**Redox reactions:** The reactions involving both reduction and oxidation.

**Reducing sugars:** The sugars that contain an aldehyde or ketone functional group that can reduce Fehling's solution and Tollens' reagent.

**Reduction potential:** The measure of tendency of the reduction that occurs at the electrode at equilibrium.

**Reference electrode:** An electrode of known potential connected to the electrode whose potential is to be determined.

**Refining of metals:** The purification of the impure metals obtained from reduction process.

**Regioselectivity:** A reaction in which one direction of bond making or breaking occurs preferentially over all other possible directions.

**Reimer-Tiemann reaction:** A chemical reaction involving the treatment of phenol with chloroform in the presence of aqueous sodium or potassium hydride at 67 °C giving 2-hydroxybenzaldehyde (salicylaldehyde) as a product.

**Resonance structures:** The structures describing delocalization of electrons.

**Reverse osmosis:** A process in which pressure greater than the osmotic pressure is applied to a system and the flow of water/solvent can be reversed from that of osmosis.

**Reverse reactions:** The reactions which occur both in the forward and backward directions.

**Roasting:** A process in which the concentrated ore is heated to a high temperature (just below its fusion temperature) in the presence of excess of air.

**Rosenmund reduction:** A reaction in which H<sub>2</sub> gas is passed through boiling o-xylene solution of the acyl chloride in the presence of Pd catalyst over BaSO<sub>4</sub>.

**Salt bridge:** A device used in galvanic cell to connect oxidation and reduction half cells.

**Sandmeyer reaction:** A reaction in which arenediazonium salts react with cuprous chloride, cuprous bromide and cuprous cyanide to give products in which the diazonium group has been replaced by  $-Cl$ ,  $-Br$  and  $-CN$ , respectively.

**Schiff's test:** A chemical test for detection of aldehydes where the formation of purple color indicates their presence.

**Schottky defects:** The defect when a pair of one cation and one anion of equal valence is missing from an ionic crystal forming a pair of vacant sites.

**Secondary alcohol:** The alcohol which has the hydroxyl group bonded to the carbon which has two other carbons attached to it.

**Secondary alkyl halides:** The compounds with carbon atom bearing the halogen atom attached to two other carbon atoms.

**Secondary cells:** The cells in which redox reaction can be reversed by passage of current.

**Secondary structure of protein:** Local conformation such as helices, pleated sheets, and turns in the polypeptide backbone of protein.

**Secondary valence:** The total number of ligands coordinately bonded to the central metal ion inside the coordination sphere.

**Selectivity of catalyst:** The ability of a catalyst to affect the rate of certain reaction and prevent the other side reactions.

**Semiconductors:** The solids with electrical conductivity which is intermediate between conductors and insulators.

**Semisynthetic polymers:** The polymers obtained from natural polymers by subjecting them to some chemical processes.

**Slag:** The by-product produced during metal smelting process.

**Smelting:** A process in which an oxide is added to the concentrated ore to combine with other impurities and form a molten layer that is immiscible with the molten metal.

**Sol:** A solid suspended in a liquid.

**Solute:** The component that is dissolved or is the least abundant component in the solution.

**Solution:** A system in which one or more substances are homogeneously mixed or dissolved in another substance.

**Solvation effect:** The effect of solvent molecules on the behavior of macromolecules present in a solution.

**Solvation energy:** The energy released when ions in crystal lattice associate with molecules present in solvent.

**Solvent:** The most abundant component in the solution.

**Sorption:** A process in which both absorption and adsorption takes place.

**Spectrochemical series:** The arrangement of ligands in order of increasing ligand field strength.

**Standard cell potential:** The potential of a galvanic cell at standard state.

**Starch:** A polysaccharide consisting of large number of glucose units linked together by glycosidic bonds.

**Stephen reaction:** A reaction in which aldehydes can be prepared by partial reduction of alkyl or aryl cyanides.

**Stereogenic center:** An atom bonded to different groups in such a manner that its mirror image is non-superimposable.

**Stereoisomers:** The compounds with the same molecular formula that differ only in the arrangement of atoms in space. These are further of two types, geometrical isomers and optical isomers.

**Steric hindrance:** The hindrance created in a chemical reaction due to the presence of neighboring atoms.

**Stoichiometric coefficient:** The degree to which a chemical species participates in a chemical reaction.

**Stoichiometry:** The branch of chemistry that deals with the relationship between relative quantities of reactants and products.

**Storage cells:** The cells in which energy is stored in the form of chemical energy.

**Strong electrolytes:** The electrolytes which are almost completely dissociated in their aqueous solutions and have a large value of conductance.

**Strong field ligand:** A ligand that exerts a strong crystal or ligand field and generally forms low spin complexes with metal ions when possible.

**Structural isomerism:** Arises due to the difference in arrangement of atoms/ions surrounding the central metal ion. Its various types are ionization isomerism, coordination isomerism, hydrate isomerism and linkage isomerism.

**Substrate:** The molecule upon which an enzyme acts in a chemical reaction.

**Sucrose:** A disaccharide which is found in all photosynthetic plants and is obtained commercially from sugarcane or sugar beets.

**Sulphonamides:** The compounds formed when primary and secondary amines react with sulphonyl chlorides.

**Superconductors:** The conductors having no resistance to electricity.

**Surface chemistry:** The study of chemical processes that occur at the interface between a solid and a gas or a solid and a solute in a solution.

**Swarts reaction:** A reaction in which alkyl fluorides are obtained by heating alkyl chloride or bromide in the presence of metallic fluorides.

**Synthetic detergent:** The surfactants that clean fabric or skin when in dilute solutions.

**Synthetic polymers:** The polymers synthesized from simple molecules (monomers).

**Synthetic rubber:** The substitute of natural rubber made from homopolymers of 1,3-butadiene derivatives or copolymers of 1,3-butadiene or its derivatives with another unsaturated monomer.

**Tautomerization:** A chemical reaction which readily interconverts the tautomers, which are constitutional isomers that rapidly interconvert by the migration of a proton.

**Tertiary alcohol:** The alcohol which has the hydroxyl group bonded to the carbon which has three other carbons attached to it.

**Tertiary alkyl halides:** The compounds with carbon atom bearing the halogen atom attached to three other carbon atoms.

**Tertiary structure of protein:** Three-dimensional shape of protein that arises from further folding of its polypeptide chain.

**Tetrahedral complex:** A complex wherein four atoms or groups of atoms or ligands are symmetrically arranged around a central atom.

**Therapeutic effect:** The desirable and beneficial results expected to occur when a drug is administered.

**Thermodynamic defects:** The defects that depend upon the temperature.

**Thermoplastic polymers:** The polymers that soften on heating and which can be converted into any shape on cooling without affecting their properties much.

**Thermosetting polymers:** The cross-linked or heavily branched polymers that undergo chemical changes and cross-linking on heating and become permanently hard, rigid and infusible on cooling. They do not soften on reheating; instead undergo degradation.

**Threshold energy:** The minimum amount of kinetic energy which must be associated with the molecules so that their mutual collisions result in a chemical reaction.

**Thyroxin:** The iodine-containing hormone that helps to regulate human metabolism.

**Tollens' test:** A chemical test to distinguish between aldehyde and ketone by the use of Tollens' reagent (a solution of aqueous silver nitrate with aqueous ammonia).

**Tranquilizers:** The drugs used to control stress, anxiety or tension.

**Trans isomerism:** Isomerism in which the two identical ligands are on the opposite side.

**Transcription:** The process of synthesis of RNA from DNA.

**Transition metals:** The elements in which the atoms in their ground state have partly filled *d*- and *f*- shells.

**Transition state:** The energy maximum on the potential energy surface of a reaction, when all the reacting species have acquired minimum amount of potential energy needed for conversion into products.

**Trichlormethane (chloroform):** A trichloro-derivative of methane.

**Triiodomethane (Iodoform):** A triiodo-derivative of methane.

**Trimolecular reactions:** The reactions which involve three molecular species as a reactant.

**Trisaccharides:** The carbohydrates that yield 3 molecules of monosaccharides.

**Two-dimensional lattice:** A two-dimensional representation of the arrangement of atoms in a crystal.

**Tyndall effect:** The phenomenon in which beam of light passes through a colloidal dispersion and the colloid particles absorb the incident light, scatter it and thus get illuminated.

**Ultrafiltration:** A process involving removal of impurities from colloidal solutions by filtering through specially prepared filter papers.

**Unidentate ligands:** The ligands capable of binding to the central metal ion via single donating site or atom.

**Unimolecular reactions:** The reactions which involve only one molecular species as a reactant.

**Unipositive ion:** An ion carrying a single positive charge.

**Unit cell:** A small three-dimensional representative structural subunit of the lattice.

**Vacancy defects:** The defects in which some of the lattice sites in the crystal are vacant.

**Vacancy:** A vacant lattice position in which the atom is missing.

**Valence bond theory:** A theory of covalent bonding that views a bond as being formed by the sharing of one pair of electrons between two overlapping atomic or hybrid orbitals.

**Van't Hoff's factor:** The ratio of the total number of moles of particles after association/dissociation to the number of moles of particles before association/dissociation.

**Vapor phase refining:** A process of metal purification in which the metal is converted to its volatile compound and the vapors are collected and decomposed to give pure metal.

**Vasodilation:** The widening or expansion of blood vessels resulting from relaxation of the smooth muscle fibres in the wall of the arteriole.

**Vinyl halides:** The compounds with halogen atom attached to carbon-carbon double bond.

**Vitamins:** The organic compounds which are required in small amounts in the diets of animals in order to ensure healthy growth and reproduction.

**Void:** An empty space in the arrangement of atoms/molecules.

**Volatile liquids:** The liquids which evaporate easily.

**Volume percentage:** The volume of a liquid in 100 mL of solution.

**Volumetric analysis:** The method of quantitative chemical analysis in which the amount of a substance is determined by measuring the volume that it reacts with.

**Vulcanization:** The process of heating and mixing the crude rubber with sulphur to a definite temperature for a specific time. It results in cross-linking in natural rubber and adds to its strength.

**Weak electrolytes:** The electrolytes which do not undergo complete dissociation even in their dilute aqueous solutions and have low value of conductance.

**Weak field ligand:** A ligand that exerts a weak crystal or ligand field and generally forms high spin complexes with metals.

**Wolff-Kishner reduction:** A reaction involving reduction of aldehydes and ketones to the corresponding hydrocarbons by heating them with hydrazine and KOH or potassium *tert*-butoxide in a high boiling solvent.

**Wrought iron:** An alloy of iron with a very low carbon content obtained by puddling pig iron in molten state.

**Wurtz reaction:** A reaction involving formation of symmetrical alkanes from alkyl halides using sodium metal.

**Wurtz-Fittig reaction:** A reaction for preparing homologues of benzene from aryl and alkyl halides and sodium metal.

**Zeigler-Natta catalyst:** A catalyst used in the synthesis of polymers of 1-alkenes ( $\alpha$ -olefins).

**Zeolites:** The naturally occurring hydrated aluminosilicates minerals which may be represented by the general formula  $\text{Na}_2\text{OAl}_2\text{O}_3 \cdot x\text{SiO}_2 \cdot y\text{H}_2\text{O}$ .

**Zero order reactions:** The reactions in which concentration of the reactant does not affect the reaction rate.

**Zone refining:** A technique to purify materials in which a narrow molten zone is moved slowly along the complete length and impurities remain in the molten region.

**Zwitterion:** A neutral ion containing positive and negative charges.

