

COURSE III BCH 103 PHYSICAL CHEMISTRY-I

Block 1 Mathematical and Computers fundamentals

Unit-1 Unites and Dimensions

Basic units, derived unite, SI Prefixes.,Grammatical Rules for Representing the SI Unites

Conversion of Non- SI unit to SI units

Block 2 States of Matter

Unit-2 Gases State I

Postulates of kinetic theory of gases, Deviation from ideal behavior, Van der Waals equation state,Critical Phenomena, PV isotherms of real gases, Continuity of states, The isotherms of van der Waal equation, Relationship between critical constants and van der Waals constants

The law of corresponding states, Reduced equation of state

Unit-3 Gases State II

Molecular velocities, Root mean square,Average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities ,Collision number,Mean free path and collision diameter, Liquification of gases (based on Joule Thomson effect)

Unit-4 Liquid stateIntermolecular forces, Structure of liquid (a qualitative description)

Structural differences between solid, liquid and gases, Liquid crystal: difference liquid crystal, solid and liquid, Classification, structure of nematic and cholesterol phases

Unit -5 Solid state

Definition of space lattice, unit cell, Law of crystallography ,Law of constancy of interfacial angles, Law of rationality of indices, Law of symmetry, Symmetry element in crystals, X-ray diffraction by crystals ,Derivation of Bragg's equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method) ,Liquid in solid (gels),Classification, preparation and properties, inhibition,General application of colloid

Block 3 Dynamics and Macromolecules

Unit -6 Chemical kinetics-I

Chemical kinetics and its scope, Rate of reaction, Factors affecting the rate of reaction, Concentration, Pressure, temperature, solvent, light, catalyst, Order of reactions(only General discussion), Zero order, first order, second order, third order and pseudo order, Integrated rate law equation for Zero and First order of reaction

Unit -7 Chemical kinetics-II

Integrated rate law equation of zero and first order of reaction ,Half life periods, Radioactive decay as a first order phenomenon, Concept of activation energy

Unit -8 Colloids and Macromolecules

Definition of colloids, Classification of colloids, Solid in liquid (sols), Properties- kinetic, optical and electrical, Stability of colloids, protective action, Hardy-Schulze law, Gold number, Liquid in liquid (emulsion), Types of emulsion, preparation, Emulsifier

Unit -9 Catalysis

Catalysis, Characteristics of catalyzed reactions, Classification of catalysis, Miscellaneous examples

Block 3 Thermodynamics-I

Unit-10 Basic Concepts of thermodynamics

Definition of thermodynamics terms ,System surrounds,Types of systems, Intensive and extensive properties, States and path functions and their differentials, Thermodynamic process
Concept of heat and work

Unit-11 First law thermodynamics

Statements, Internal energy and enthalpy, Heat capacity, Heat capacity at constant volume and pressure, Joule Thomson effect, Joule Thomson coefficient ,Calculation of w , q , dU and dH for the expansion of ideal gases

Unit-12 Thermochemistry

Standard state, Standard enthalpy of formation, Hess law and its applications, Heat of reaction at constant pressure and constant volume, Enthalpy of neutralization, Bond dissociation energy and its calculation, Temperature dependence of enthalpy, Kirchhoff's equation