

FCYC102	Physical Chemistry-I	3-0-0	3
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Module-I

Gaseous state: Postulates of Kinetic theory of gases, deviation from ideal behavior, vander walls equation of state. Critical phenomena: PV isotherm of real gases, continuity of states, the isotherms of van der walls equation, relationship between vander waals constant and critical constants, the law of corresponding states, reduced equation of state.

Molecular velocities and the relation between them, qualitative discussion on Maxwells distribution of molecular velocity, collision number, mean free path and collision diameter, liquefaction of gases(based on Joule-Thomson effect) [7hrs]

Module-II

Liquid state: Intermolecular forces, structure of liquids (qualitative description), liquid crystals: difference between liquid crystals, solids and liquids. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell. [4hrs]

Module-III

Solid state: space lattice and unit cell. Law of crystallography, symmetry elements in crystals. X-ray diffraction in crystals. Derivation of Braggs eqn., Determination of crystal structure of NaCl, KCl and CsCl [10hrs]

Module-IV

Chemical Kinetics and catalysis: Rates of reactions, factors influencing rates of reaction- conc., temp, pressure, solvent, light, catalyst. Arrehenius eqn. concept of activation energy, collision theory of reaction rates, transition state theory, Order and molecularity, mathematical characteristics of simple chemical reactions-zero order, first order, second order, pseudo order, half and mean life. Determination of the order of reaction (differential method, half life period method, method of isolation and integration)

Catalysis: characteristic of catalysed reactions, classification of catalysis

[12hrs]

Essential readings:

1. P.W. Atkins and Julio de Paula, Elements of Physical Chemistry, Oxofrd University Press, 1992
2. M. R. Wright, An Introduction to Chemical Kinetics, John Wiley & Sons, 2005.
3. J. Raja Ram, and J. C. Kuriacose, Kinetics and Mechanism of Chemical Transformations, MacMillan Indian Ltd., New Delhi, 1993.
4. G N Barrow, Physical Chemistry, TATA MCGRAW-HILL, 2007.
5. K. L. Kapoor, Text Book of Physical Chemistry, MACMILLAN, 2006
6. R. I. Masel, Chemical Kinetics & Catalysis, Wiley-Interscience; 1st Edition, 2001.
7. K. K. Rohatgi, S. Mukherjee, Fundamentals of Photochemistry, Wiley, New York, 3rd Edition