Syllabus

Panjab University Chandigarh
B.Sc. Part–I (Semester I)

Paper III : Physical Chemistry-A

Time : 3 Hrs.
Max. Marks : 22 + 3
30 Hrs. (2 Hrs/week)
3 Periods/week

UNIT–I   (8 Hrs.)

Mathematical Concepts and Evaluation of Analytical Data

Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation and integration of functions like e^x, x^n, $\sin x$, $\log x$; maxima and minima, partial differentiation and reciprocity relations.

Terms of mean and median, precision and accuracy in chemical analysis, determining accuracy of methods, improving accuracy of analysis, data treatment for series involving relatively few measurements, linear least squares curve fitting, types of errors, standard deviation.

UNIT–II   (7 Hrs.)

Gaseous States

Postulates of kinetic theory of gases, deviation from ideal behaviour, van der Waals' equation of state.

Critical Phenomena : PV isotherm of real gases, continuity of states, the isotherms of van der Waals' equation, relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of state.

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. Liquefaction of gases (based on Joule-Thomson effect).

UNIT–III   (8 Hrs.)

Chemical Kinetics–I

Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction-concentration, temperature, pressure, solvent, light, catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions – zero order, first order, second order, pseudo order, half life and

mean life. Determination of the order of reaction – differential method, method of integration, method of half life period and isolation method.

Radioactive decay as a first order phenomenon.

UNIT–IV (7 Hrs.)

Chemical Kinetics–II

Theories of Chemical Kinetics : Effect of temperature on rate of reaction. Arrhenius equation, concept of activation energy.

Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis). Expression for the rate constant based on equilibrium constant and thermodynamic aspects.

Catalysis and general characteristics of catalytic reaction, Homogeneous catalysis, acid-base catalysis and enzyme catalysis including their mechanism, Michaelis Menten equation for enzyme catalysis and its mechanism.

Instructions for paper setters and candidates :

(i) *Examiner will set total of NINE questions comprising TWO questions from each unit and ONE compulsory question of short answer type covering whole syllabi.*

(ii) *The students are required to attempt FIVE questions in all, ONE question from each unit and the Compulsory question.*

(iii) *Compulsory question carriers six marks and remaining all questions carry four marks each.*