

Syllabus

B.Sc. Part-III

PANJAB UNIVERSITY, CHANDIGARH

PHYSICAL CHEMISTRY-B

Paper-XXIII

SEMESTER-VI

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

OBJECTIVE OF THE COURSE

To teach the fundamental concepts of Chemistry and their applications. The syllabus pertaining to B.Sc. (GENERAL) (Semester system) in the subject of Chemistry has been upgraded as per provision of the UGC module and demand of the academic environment. The course contents have been revised from time to time as per suggestions of the teachers of the Chemistry working in the Panjab University, Chandigarh and affiliated colleges. The syllabus contents are duly arranged unit wise and contents are included in such a manner so that due importance is given to requisite intellectual and laboratory skills.

UNIT-I

(7 Hrs.)

Solid State-I :

Definition of space lattice, unit cell and Miller Indices

Laws of Crystallography – (i) Law of Constancy of Interfacial Angles, (ii) Law of Rationality of Indices, (iii) Law of Symmetry. Symmetry elements in crystals.

UNIT-II

(8 Hrs.)

Solid State-II

X-ray diffraction by crystals. Derivation of Bragg equation. Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method). Applications of Powder diffraction for structure determination, Thermal and photochemical reaction in solid state.

UNIT-III

(8 Hrs.)

Spectroscopy :

Introduction : Electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.

Rotational Spectrum :

Diatomic molecules. Energy levels of a rigid rotor (semi – classical principles), selection rules, spectral intensity, determination of bond length, qualitative description of non-rigid rotor, isotope effect.

UNIT-IV

(7 Hrs.)

Vibrational Spectrum :

Infrared Spectrum : Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups. Raman Spectrum : Concept of polarizability, pure rotational and pure vibrational, Raman Spectra of diatomic molecules, selection rules.

Electronic Spectrum :

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck - Condon principle.

Qualitative description of σ , π – and n M.O., their energy levels and the respective transitions.

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 carries six marks and remaining all questions carry four marks each.