

SARDAR PATEL UNIVERSITY  
F. Y. B. Sc. (Semester – I)  
Syllabus of FSCH-101 (GENERAL CHEMISTRY)  
[02 Credits]  
(Effective from June – 2010)  
Total Marks: 100 [30+70]

**UNIT 1 Analytical Chemistry**

(07 hrs)

Introduction, Applications, Stages of analysis, Selecting the methods, Quantitative analysis, Limitations of analytical methods, classification of errors, accuracy, precision, how to reduce systematic errors, significant figures, mean and standard deviation, distribution of random errors, reliability of results.

Reference Book:

1. Vogel's textbook of quantitative chemical analysis, 6<sup>th</sup> Edition, J Mendham, R C Denney, J D Barnes, M J K Thomas

**UNIT 2 Ionic Equilibria in Aqueous Solution**

(08 hrs)

Sparingly soluble salts, Common – ion effect, Selective precipitation, Arrhenious theory of Acids and Bases, The Lowry – Bronstred Concept, Strnegth of Acids and Bases, The Lewis concept, The pH Scale, Self Ionization of Water.

Reference Book:

1. University Chemistry By Bruce H Mahan 4<sup>th</sup> edition, Narosa Publishing House.

**UNIT 3 Alkanes, Alkenes and Alkynes**

(08 hrs)

Introduction of Hydrocarbons, Physical properties of alkanes, Higher alkanes- The homologous series, Nomenclature, Alkyl groups, Common names of alkanes, IUPAC names of alkanes, Classes of carbon atom and H-atoms, Physical properties, Geometric Isomerism, Name of alkenes, Nomenclature. Qualitative and quantitative analysis of organic compounds. Molecular formula: its fundamental importance, Quantitative elemental analysis, Quantitative elemental analysis: Carbon, Hydrogen and Halogen (Carius Method), Empirical Formula, Molecular weight: molecular formula, Quantitative elemental analysis (kJeldahl & Dumas methods)

Reference Book:

1. Organic Chemistry by Morrison & Boyd 6<sup>th</sup> Edition.

**UNIT 4 Basic Concepts of Coordination Chemistry**

(07 hrs)

Definition of Some Terms, Classification of Ligands, Chelation, Classification of Chelates, Uses of Chelates, Co-ordination Number and Stereochemistry of Complexes, Nomenclature of Co-ordination Compounds.

Reference Book:

1. Selected Topics in Inorganic Chemistry, Wahid U. Malik, G. D. Tuli, R. D. Madan.

SARDAR PATEL UNIVERSITY  
F. Y. B. Sc. (Semester – I)  
Syllabus of FSCH-102 (INORGANIC CHEMISTRY)  
[02 Credits]  
(Effective from June – 2010)  
Total Marks: 100 [30+70]

**UNIT 1 Atomic Structure**

(08 hrs)

De Broglie's Concept of Dual Character of Matter, De Broglie's Wave Equation, Derivation of De Broglie's Equation, Heisenberg's Uncertainty Principle, Problems Based on De Broglie's Wave Equation and Heisenberg's Uncertainty Principle, Schrodinger Wave Equation, Derivation of Schrodinger Wave Equation, Other Forms of Schrodinger Wave Equation, To Convert Cartesian Coordinates into Polar Coordinates, Schrodinger Wave Equation for H Atom in Cartesian and Polar Coordinates, Significance of  $\Psi$  and  $\Psi^2$ , Electron Probability Function D, Plot of  $R_{n,l}$  against r and its Relation with the Electron Probability Density Around Point at a Distance of r from the Nucleus, Values of Angular Wave Function  $\theta_{l,m} \times \Phi_m$  for s and p Orbitals and to their Shapes, Shielding Effect and Effective Nuclear Charge, Factors Affecting the Magnitude of  $\sigma$  and  $Z_{\text{eff}}$  and their Variation in the Periodic Table, Slater's Rule for Calculating  $\sigma$  and  $Z_{\text{eff}}$ , Problems.

Reference Book:

1. Advanced Inorganic Chemistry Volume I, Satyaprakash, G D Tuli, S K Basu, R D Madan.

**UNIT 2 Periodic Properties**

(07 hrs)

Brief Introduction of Periodic Table, Ionization Energy, Successive Ionization Energies, factors Affecting Magnitude of Ionization Energy, Variation of IE Values in Main Group Elements, Variation of IE Values in Different Groups, Ionization Energies of Isoelectronic Species, to Find out the Order of Second IE Values of the Elements of Second Period, Difference Between Ionization Potential and Electrode Potential of a Metal.

Electron Affinity, Relation Between EA of  $X_{(g)}$  Atom and IE of  $X_{(g)}^-$  Ion,  $EA_2$  Represents Energy Required, Factors Affecting the Magnitude of Electron Affinity, Variation of Electron Affinity in Main Group Elements of the Periodic Table, Variation of Electron Affinity Values of Elements of Different Groups.

Electronegativity, Different Methods Used for Calculating Electronegativity, Factors Affecting the Magnitude of Electronegativity, Variation of Electronegativity in a Group of s and p Block Elements, Variation of Electronegativity of The Elements of Different Group. Variation of Electronegativity in a Period of s and p Block Elements, Applications of Electronegativity.

Reference Book:

1. Advanced Inorganic Chemistry Volume I, Satyaprakash, G D Tuli, S K Basu, R D Madan.

### **UNIT 3 Chemical Bond 1**

(07 hrs)

The Lewis Theory, Sidgwick – Powell Theory, Valence Shell Electron Pair Repulsion (VSEPR) Theory, effect of Lone Pairs, Effect of Electronegativity, Isoelectronic Principle, Some Example using VSEPR Theory, Valence Bond Theory (VBT), Hybridization involving s and p Orbitals ( $sp$ ,  $sp^2$ ,  $sp^3$ )

Reference Book:

1. Concise Inorganic Chemistry, 5<sup>th</sup> Edition, J D Lee

### **UNIT 4 Chemical Bond 2**

(08 hrs)

Molecular Orbital Method, LCAO Method, s-s Combination of Orbital, s-p Combination of Orbitals, p-p Combination of Orbitals, Rules for Linear Combination of Atomic Orbitals, Examples of Molecular Orbital Treatment for Homonuclear Diatomic Molecules  $H_2^+$ ,  $H_2$ ,  $He_2^+$ ,  $He_2$ ,  $Li_2$ ,  $Be_2$ ,  $B_2$ ,  $C_2$ ,  $N_2$ ,  $O_2$ ,  $O_2^-$ ,  $O_2^{2-}$  and  $F_2$ .

Reference Book:

1. Concise Inorganic Chemistry, 5<sup>th</sup> Edition, J D Lee

SARDAR PATEL UNIVERSITY  
F. Y. B. Sc. (Semester – I)  
Syllabus of FSCH-103 (Chemistry Practicals)  
[02 Credits]  
(Effective from June – 2010)  
Total Marks: 100 [30+70]

[A] Volumetric

1. To determine amount  $\text{Cu}^{+2}$  by using Fast sulphon Black – F indicator
2. To determine amount of  $\text{Ni}^{+2}$  by EDTA using murexide indicator.
3. To determine amount of  $\text{Mg}^{+2}$  by EDTA using Eriochrom Black – T

[B] Analysis of Inorganic substances

$\text{Pb}(\text{NO}_3)_2$ ,  $\text{CdCl}_2$ ,  $\text{Cu}_3(\text{PO}_4)_2$ ,  $\text{CaCO}_3$ ,  $\text{Al}_2(\text{SO}_4)_3$ ,  $\text{MnSO}_4$ ,  $\text{NiCO}_3$ ,  $\text{CuS}$ ,  $\text{ZnS}$ ,  $\text{BaCl}_2$ ,  
 $\text{Sr}(\text{NO}_3)_2$ ,  $\text{ZnCO}_3$ ,  $\text{MgSO}_4$ ,  $\text{AlPO}_4$ ,  $\text{K}_2\text{Cr}_2\text{O}_7$ ,  $\text{KBr}$ ,  $\text{KCl}/\text{NH}_4\text{Cl}$ ,  $\text{KI}$ ,  $(\text{NH}_4)_3\text{PO}_4$ ,  $\text{ZnO}$ ,  
 $\text{MnO}_2$

Reference Book:

1. Vogel's textbook of quantitative chemical analysis, 6<sup>th</sup> Edition, J Mendham, R C Denney, J D Barnes, M J K Thomas
2. Practical Chemistry, O P Pandey, D N Bajpai, S Giri
3. An Advanced course in Practical Chemistry, Ghoshal, Mahapatra, Nad.