

BS23MJ1CH1
B. Sc. Semester –I Chemistry (Major-I)

Unit – I: Atomic Structure

Atomic spectrum of Hydrogen atom, De Broglie equation, Heisenberg's Uncertainty principle and its significance, Schrodinger wave equation, significance of ψ and ψ^2 , Quantum mechanical model of atom (Concept of atomic orbital), Difference between orbit and orbital, Quantum numbers and their significance, Radial and angular wave function for hydrogen atom, Radial function plots, Radial probability distribution plots, Shape of s, p and d atomic orbitals and its physical significance, Boundary surface diagram, Relative energies of orbitals, Aufbau principle and its limitations, Pauli Exclusion principle, Hund's rule of maximum multiplicity.

Unit – II: Chemical Bonding and Molecular Structure

Chemical bond, Types of bond (Ionic, Covalent, Coordinate and Metallic Bond), Conditions and factors governing the formation of ionic Bond, Born-Haber Cycle, Conditions for formation of covalent bond, Co-ordinate covalent Bond, Characteristics of ionic and covalent compounds, Condition for Hydrogen bonding, Types of hydrogen bonding, Metallic bond, Sedgwick Powel theory, VSEPR theory and its application for CH_4 , NH_3 , H_2O , ClF_3 , SF_4 , SF_6 , I_3^- , IF_7 , Hybridization of atomic orbitals, Rules for Hybridization, Types of hybridization and Shape of molecules with sp , sp^2 , sp^3 , sp^3d , sp^3d^2 hybridization. MO Theory, LCAO Theory, BOM, ABMO, NBMO, MO theory for Homo nuclear and Hetro nuclear diatomic molecules and calculate BO (H_2 , N_2 , O_2 , CO , NO)

Unit: III (A) Aromatic Hydrocarbons (only Benzene)

Preparation : from phenol, from Acetylene, from benzoic acid, from benzene sulphonic acid

Reaction : Electrophilic substitution reaction SE^2 with mechanism : Nitration, Sulphonation, Halogenation (Cl,Br), Friedel-craft's reaction (alkylation, acylation)

(B) Alkyl and Aryl Halides:

Alkyl Halides (up to 5 carbons) : Types of Nucleophilic substitution reaction (SN^1 & SN^2)

Preparation : from alkenes and alcohols.

Reaction : Hydrolysis, Nitrile, Nitro, Nitrite, iso-Nitrile.

Aryl Halides (only chloro and Bromo benzene)

Preparation : from phenol, from, Sandmeyer & Gattermann reaction

Reaction : (only chloro benzene) Aromatic substitution reaction (replacement by –OH group) and effect of nitro substituent , Benzyl reaction with mechanism ($\text{NH}_2^- / \text{NH}_3$)

Unit: IV : Stereochemistry:

Introduction, Stereo chemical aspects of organic molecules, Chirality, Optical isomerism, Enantiomers and Diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D - L and R-S system of nomenclature, Geometric isomerism — determination of configuration of geometric isomers, E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds, Difference between configuration and conformation, Conformational analysis of Ethane, n-Butane & Cyclohexane, Axial and equatorial bonds, conformation of mono substituted Cyclohexane derivatives (only one example), Newman projection and Sawhorse formula, Fischer and flying wedge formula.

REFERENCE BOOKS

1. '*Concise Inorganic Chemistry*' by J. D. Lee, Wiley India, 5th Ed., 2013.
2. '*Basic Inorganic Chemistry*' by F. A. Cotton, Geoffrey Wilkinson, Carlos A Murillo and Manfred Bochmann, Wiley publication, 6th Ed.
3. '*Inorganic Chemistry*' by Shriver & Atkins, Oxford University Press, 5th Ed., 2013.
4. '*Introductory Quantum Chemistry*' by A. K. Chandra, Tata Mc Graw Hill Publishing Company Limited, New Delhi, 4th Ed., 2017.
5. '*Elements of Quantum Mechanics*' by Michael D. Fayer, Oxford University Press, Indian Ed.
6. '*Satya Prakash's Modern Inorganic Chemistry*' by Dr. R. D. Madan, S Chand, Revised Ed.
7. '*Concise Inorganic Chemistry*' by J. D. Lee, Blackwell Science. 5th Ed. 3. '*Inorganic Chemistry*, by James E. Huheey, Pearson, 4th Ed, 2012.
8. '*Elements of Quantum Mechanics*' by Michael D. Fayer, Oxford University Press, Indian Ed
9. '*Basic Inorganic Chemistry*' by F. A. Cotton, Wiley publication, 6th Ed.
10. '*Quantum chemistry*' by R. K. Prasad, New Age International publishers, 2nd Ed., 1996.

11. 'Organic Chemistry' by G. Marc Loudon, 4/E, 2010, Oxford University Press, Indian Edition.
12. 'Organic Chemistry' by Robert Thornot Morrison, Robert Neilson Boyd, 6/E, 1992, Prentice Hall of India Pvt Ltd, New Delhi.
13. 'Text book of Organic Chemistry' by P. L. Soni and H. M. Chawla, 26/E, 1995, Sultan Chand & Sons Publication, New Delhi.
14. 'Text book of Organic Chemistry' by P. S. Kalsi, 1999, MacMillan of India Pvt. Ltd.
15. 'Organic Chemistry' by Bhupinder Mehta, Manju Mehta, Prentice Hall of India Pvt. Ltd, New Delhi

BS23MN1CH1
BSC Semester- 1 (Minor)
General Chemistry

Unit 1

Recapitulation of basics of Organic Chemistry

Hybridization, Shapes of molecules, Electronic Displacements: Inductive, Electromeric, resonance and Mesomeric effects, hyper conjugation, Dipole moment; Hydrogen bonding (Applications to be discussed with relevant topics) Homolytic and Heterolytic fission with suitable examples. Curly arrow rules, formal charges; Electrophiles and Nucleophiles; Types, shape and relative stability of Carbocations, Carbanions and Free radicals. Introduction to types of organic reactions: Addition, Elimination and Substitution reactions.

Unit 2

Periodicity of Elements

Brief discussion of the following properties of the elements, with reference to s & p-block and the trends shown: (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table. (b) Atomic and ionic radii (c) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization enthalpy and trends in groups and periods. (d) Electron gain enthalpy and trends in groups and periods. (e) Electronegativity, Pauling's/ Allred Rochow's scales.

Unit 3

Gaseous State

Kinetic theory of gases, Maxwell-Boltzmann's distribution of velocities, Ideal gas laws, Deviation from ideal gas laws, Ideal and real gases, Reasons for deviation from ideal gas laws, Compressibility factor, van der Waals equation of state, Critical phenomena. (Numerical problems expected wherever necessary)

SEMESTER I (Chemistry Practical for Minor)

Preparation of standard solution of Succinic Acid, Oxalic Acid (Hydrous & Anhydrous)

(1) Succinic Acid/Oxalic Acid \rightarrow NaOH

(2) Succinic Acid/Oxalic Acid \rightarrow KOH

(3) Oxalic Acid (Hydrated & Anhydrous)----- \rightarrow NaOH

(4) Oxalic Acid (Hydrated & Anhydrous) \rightarrow KOH

(5) Determination of the amount of calcium carbonate in chalk using standard HCl and NaOH solutions (back-titration)

Reference books (Theory)

1. Morrison, R. T. and Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt Ltd. (Pearson Education). 2012
2. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt Ltd. (Pearson Education).
3. Lee, J.D. *Concise Inorganic Chemistry ELBS*, 1991.
4. Douglas, B.E. and McDaniel, D.H. *Concepts & Models of Inorganic Chemistry*, Oxford, 1970
5. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry 10th Ed.*, Oxford University Press (2014).
6. Castellan, G. W. *Physical Chemistry 4th Ed.* Narosa (2004).
7. Puri B. R., Sharma L. R. & Pathania M. S. *Principles of Physical Chemistry*, Vishal Publishing Company, 2008

Reference Books (Practical)

1. 'Vogel's Textbook of Macro and Semi Micro Qualitative Inorganic Analysis', Orient Longman Ltd. 5th Ed.
2. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language Book Society) Longman. 5th Ed.
3. 'Analytical Chemistry' by Dhruba Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
4. 'Analytical Chemistry' by Gary D. Christian, 4th Ed., John Wiley & Sons.
5. 'Advanced Practical Inorganic Chemistry' by Gurdeep Raj, Goel Publishing House, Meerut, 9th Ed.

BSC23SE102

BSC Semester- 1

Basics of Analytical Chemistry

Unit 1 : Chemistry Laboratory

Introduction: General introduction to chemistry lab, safety rules and precautions in chemistry laboratories, storage, ventilation, lighting, fumes, cupboard, hazards, precautions, maintenance of laboratory, definition of equipment/ apparatus, cleaning of laboratories, apparatus and preparation room. Lab Apparatus (A) Glass apparatus Beaker, test tube, boiling tube, conical flask, filtration flask, round bottom flask, flat bottom flask, funnel, separating funnel, watch glass, measuring cylinder, Petridis, desiccators, measuring cylinder, glass rod, glass tube. (B) Volumetric and Heating apparatus Volumetric apparatus: Volumetric flask, burette, pipette, analytical balance, electronic balance. Heating apparatus: Bunsen burner, water bath, sand bath, hot air oven, heating mantle (C) Miscellaneous Apparatus Buchner funnel, burner, test tube stand, tong, burette stand, clamp, china dish, wire gauze, cork, vacuum pumps, crucibles, clay pipe triangle, pestle and mortar, spatulas, thermometer, pH meter, Kipp's apparatus.

Unit 2 : Laboratory Reagents and Solvents Reagents

Classification of reagents according to their action; (i) acids (ii) bases (iii) salts (iv) complexing agents (v) oxidizing and reducing agents (vi) precipitating agents (vii) chelating agents. Each type to be explained with at least one suitable example. Primary and secondary standards: Definition, characteristics, uses examples for different types of reactions. Solvents: Solute, Solvent & Solution, classification of solvents (i) Protic and aprotic (ii) Acidic, basic amphiprotic and neutral (iii) Aqueous and non-aqueous (iv) Polar and non polar. Each type is to be explained with at least one example.

Unit 3 : Solution Preparation

Solutions, components of a solution, types of solution, solubility, concentration terms - percentage, ppm, ppb, g/L, molarity, normality, molality, calculation of masses and volumes for preparation of solutions and their practical approach.

Physicochemical Principles used in Chemistry Laboratory Ostwald dilution law, common ion effect, solubility product, precipitate, residue, precipitation, Le Chatelier's principle

Recommended Texts:

1. Vogel, Arthur I: A Test book of Quantitative Inorganic Analysis (Rev. by GH Jeffery and others) 5th Ed. The English Language Book Society of Longman
2. Willard, Hobert H. et. al: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, Gary D; Analytical Chemistry, 6th Ed. New York- John Willy, 2004.
4. Harris, Daniel C, Quantitative Chemical Analysis, 3 rd Edition, W.H. Freeman and Company, New York, 2001.
5. Khopkar, S.M. Basic Concepts of Analytical Chemistry New Age, International Publisher, 2009.
6. Koogs, West and Holler, Fundamentals of Analytical Chemistry, 6 th Edition, Saunders College Publishing, New York. 1991.

B. Sc. Semester –II
Theory (Major-1)
BS23MJ2CH1

Objectives:

- To develop basic and advance concepts regarding thermodynamics.
- To derive and understand the expressions for determining rate of reactions and kinetics for various types of chemical reactions.
- To study the concept of ionization in aqueous solution, pH, buffers and various applications of ionization.
- To acquaint the students with functional groups such as –alcohols, phenols, aldehydes and ketones including their reactions and preparations.
- To introduce polynuclear hydrocarbons, their reactions and synthesis.
- To study various effects which are characteristic to organic compounds owing to their structures.

Learning outcomes:

On completion of the course, the student will be able to:

- Understand and apply laws of thermodynamics to analyze and solve problems related to entropy during different changes and processes.
- Define various terms of chemical kinetics and solve problems involving rate equations and half-life determination for different order reactions and understand and predict kinetics of various reactions.
- Explain the concept of electrolytes, ionization of electrolytes, various types of conductance, with emphasis on weak acid and base and hydrolysis of salt, indicators used in different acid-base titration.
- Classify organic compounds into alcohols, phenol, aldehydes and ketones and explain their synthesis methods and perform specific tests for their identification. Analyze and predict reactions involving alcohols, phenols, aldehydes and ketones.
- Understand the concepts of polynuclear hydrocarbons, their synthesis and reactions
- Interpret the impact of various factors on molecular structures and reactivity. Analyze and predict the behavior of molecules based on structural effects.

Unit: I (A) Thermodynamics :

Zeroth law, first law, Limitations of first law and need for the second law, Second law of thermodynamics; proof of 2nd law (Carnot's Cycle); Entropy of Gas and calculation of entropy for different processes; Entropy change during phase change, entropy of mixing of ideal gases, entropy change in reversible and irreversible process, Kirchhoff's equation.

(B) Chemical Kinetics :

Basic terms: molecularity, order of reactions. Unit for rate constant, Derivation of: first order rate constant, Second order rate constant for (a=b) and (a ≠ b), Third order rate equation (a=b=c), Determination of Half Life Time for 1st, 2nd and 3rd order reactions, Kinetics of opposing and consecutive reaction.

Unit: II Ionic equilibrium

Definition of basic terms: Strong & Weak electrolytes, Electrical conductance, Specific conductance, Equivalent conductance, Molar conductance, Cell constant and its determination, Incomplete dissociation, Degree of dissociation, Oswald's dilution law and its limitations, Kohlraush law and its application, Self ionization of water and Ionic product of water K_w , pH Scale, Hydrolysis of different salts (strong acid and weak base, strong base and weak acid, weak acid and weak base) including relation between K_a , K_b , K_h , h , K_w and their pH equation, Buffer Solutions, Henderson – Hasselbalch equation, Indicator theory, Useful pH range of indicator for acid and base titration.

Unit: III (A) Alcohols, Phenols (Up to 6 Carbons):

Alcohol : Preparation of 1°, 2°, 3° alcohols using Grignard reagent, Ester hydrolysis, reduction of aldehydes, ketones, carboxylic acids and esters. Reaction with Na, HX (Lucas test), esterification, oxidation (PCC, alk. $KMnO_4$, Acidic dichromate, $Con.HNO_3$) (Up to 6 Carbons)

Phenols : Preparation of phenol by Dow, Cumene and diazotization process. Reaction of Phenol : Electrophilic substitution (Nitration, Halogenation) Reimer-Tiemann Reaction, Gattermann –Koch Reaction, Schotten-Baumann Reaction.

(B) Aldehydes, Ketones :

(Formaldehyde, Acetaldehyde, Benzaldehyde, Acetone, Acetophenone)

Preparation: From Alcohol, Acid Chloride, Nitriles (Grignard reagent)

Reaction : With HCN, ROH, $NaHSO_3$, NH_2-NH_2 , $NH_2-NH-Ph$, Iodoform test, Aldol Condensation, Cannizzaro reaction, Clemmensen reduction and Wolff-kishner reduction.

Unit: IV (A) Polynuclear Hydrocarbon:

Nomenclature, structure and synthesis of Naphthalene and substituted Naphthalene (Only Howarth synthesis), Reactions (oxidation reduction and electrophilic substitution reaction (ESR) of naphthalene. Howarth synthesis of Anthracene and Phenanthrene.

(B) Chemical Reactivity and Molecular Structure:

Acid-Base, Scale of acidity-basicity, Resonance effect, drawing of structure and the condition for resonance, Effect of change of hybridization on acidity and basicity, Inductive and electronic effects, steric effect and hydrogen bonding,

REFERENCE BOOKS

1. 'Elements of Physical Chemistry' by Peter Atkins & Julio De Paula, 5/E, Oxford University Press, Indian Edition.
2. 'Physical Chemistry' by P. W. Atkins, 7/E, 2002, Oxford University Press, Indian Edition.
3. 'Physical Chemistry' by W. J. Moore, MacGraw Hill Publication, 1996, 6/E. 17. 'Principle of Physical Chemistry' by Puri, Sharma & Pathania, 41/E, Vishal Publishers.
4. 'Advanced Physical Chemistry' by Gurdeep Raj, 19/E, Goel Publishing House Meerut.
5. 'Essentials of Physical Chemistry' by Bahl & Tuli. 22/E, S. Chand publication New Delhi.
6. 'Advanced Physical Chemistry' by Gurdeep Raj, 19/E, Goel Publishing House, Meerut.
7. 'Organic Chemistry' by G. Marc Loudon, 4/E, 2010, Oxford University Press, Indian Edition.
8. 'Organic Chemistry' by Robert Thornot Morrison, Robert Neilson Boyd, 6/E, 1992, Prentice Hall of India Pvt Ltd, New Delhi.
9. 'Text book of Organic Chemistry' by P. L. Soni and H. M. Chawla, 26/E, 1995, Sultan Chand & Sons Publication, New Delhi.
10. 'Text book of Organic Chemistry' by P. S. Kalsi, 1999, MacMillan of India Pvt. Ltd.
11. 'Organic Chemistry' by Bhupinder Mehta, Manju Mehta, Prentice Hall of India Pvt. Ltd, New Delhi.
12. 'Essentials of Physical Chemistry' by Bahl & Tuli. 22/E, S. Chand publication, New Delhi.

B. Sc. Semester –II
Practical (Major-2)
BS23MJ2CH2

Objectives:

- To discuss principles of redox and iodimetry-iodometry titrations in detail.
- To teach preparation of solutions of different Molarity/Normality.
- To impart practical training of titration.
- To impart practical knowledge of qualitative analysis of organic compounds having monofunctional group.
- To identify various functional groups and unknown organic compounds.

Learning outcomes:

On completion of the course, the student will be able to:

- Prepare solution of different Molarity/Normality.
- Explain various methods for titration.
- Estimate amounts of titrate given in unknown concentration by titration methods.
- Determine the functional group present in the given organic compound.
- Identify the organic compound based on its qualitative properties.

(A) Volumetric Analysis:-

Redox Titrations:-

Preparation of standard solution of KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$

- (1) $\text{KMnO}_4 \rightarrow \text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ (2) $\text{KMnO}_4 \rightarrow \text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
(3) $\text{K}_2\text{Cr}_2\text{O}_7 \rightarrow \text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ (4) $\text{K}_2\text{Cr}_2\text{O}_7 \rightarrow \text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$

Iodimetry - Iodometry:

Preparation of standard solution of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

- (1) $\text{I}_2 \rightarrow \text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$
(2) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \rightarrow \text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

(B) Organic Spotting :- (08 Solids and 05 Liquids).

List of organic compounds having different only mono functional groups:

Solids:

Acids: (1) Benzoic acid (2) Oxalic acid (3) Cinnamic Acid

Phenols: (1) β -Naphthol (2) α -Naphthol (3) Resorcinol

Neutral: (1) Urea (2) Thiourea (3) Benzamide (4) Naphthalene (5)
Acetanilide

Liquids: (1) Aniline (2) Nitrobenzene (3) Benzaldehyde (4) Ethanol

(5) Ethyl acetate (6) Chloroform (7) Chloro benzene (8) Acetone

REFERENCE BOOKS

1. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language Book Society) Longman. 5th Ed.
2. 'Analytical Chemistry' by Dhruba Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
3. 'Analytical Chemistry' by Gary D. Christian, 4th Ed., John Wiley & Sons.
4. 'Comprehensive Practical Organic Chemistry – Qualitative Analysis' by V. K. Ahluwalia, Sunita Dhingra University Press (India) Private Limited, Hyderabad, First Indian Reprint 2010.
5. 'Organic Analytical Chemistry theory and Practice' by Mohan Jag, Narosa Publication, New Delhi. (2003).
6. 'Elementary Practical Organic Chemistry Part-2, Qualitative Organic Analysis' by Arthur I. Vogel- CBS Publishers & Distributors, New Delhi. (2nd Ed., reprint 2004)
7. 'Advanced practical Organic Chemistry' by J. Leonard, B. Lygo, G. Procter, Publication-Stanley Thornes (Publishers) Ltd. (First Indian reprint, 2004).

BS23MN2CH1
BSC Semester- 2 (Minor)
General Chemistry -2

Objectives:

- To analyze the strength of organic acids, emphasizing factors influencing pK values.
- To understand methods for preparing carboxylic acids and its derivatives.
- To compare nucleophilicity among acid derivatives and demonstrate interconversion between them.
- To define surface tension, its dimensions, and principles of measurement using stalagmometer.
- To explain the effects of surface tension and the working mechanisms of surface-active agents.
- To understand viscosity and the determination of viscosity coefficients.

Learning outcomes:

On completion of the course, the student will be able to:

- Demonstrate the ability to assess and compare the strength of organic acids based on pK values.
- Apply knowledge to prepare carboxylic acids using hydrolysis and Grignard reactions.
- Execute the synthesis of various acid derivatives from carboxylic acids.
- Illustrate interconversions among acid derivatives and evaluate their nucleophilicity.
- Explain and measure surface tension using stalagmometer and comprehend its effects.
- Understand the functions and mechanisms of surface-active agents.
- Determine viscosity coefficients using Ostwald viscometer and comprehend their significance.
- Discuss the qualitative impact of temperature on surface tension and viscosity coefficients in liquids.

Unit 1

Carboxylic Acids and Their Derivatives: Carboxylic acids (aliphatic and aromatic): strength of organic acids: comparative study with emphasis on factors affecting pK values; Preparation: acidic and alkaline hydrolysis of esters and from Grignard reagents. Preparation of acid chlorides, anhydrides, esters and amides from carboxylic acids; Reactions: Comparative study of nucleophilicity of acid derivatives; interconversion among acid derivatives.

Unit 2

Liquids: Definition of Surface tension, its dimension and principle of its determination using stalagmometer; some effects of surface tension, surface active agents and their working methodology, Viscosity of a liquid and principle of determination of coefficient of viscosity using Ostwald viscometer; Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).

References:

- (1) Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons.
- (2) Madan, R. L. Organic Chemistry, S. Chand & Sons.
- (3) Wade, L. G., Singh, M. S., Organic Chemistry.
- (4) Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
- (5) Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).

Chemistry Practical (Minor)
BSC sem-2
Volumetric Analysis:-

Objectives:

- To discuss principles of redox and iodimetry-iodometry titrations in detail.
- To teach preparation of solutions of different Molarity/Normality.
- To impart practical training of titration.

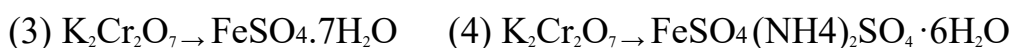
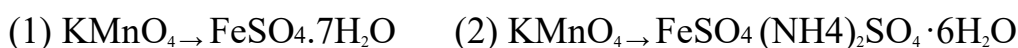
Learning outcomes:

On completion of the course, the student will be able to:

- Prepare solution of different Molarity/Normality.
- Explain various methods for titration.
- Estimate amounts of titrate given in unknown concentration by titration methods.

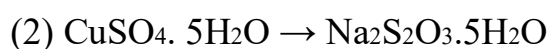
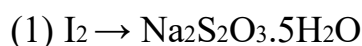
(A) Redox Titrations:-

Preparation of standard solution of KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$



(B) Iodimetry - Iodometry:

Preparation of standard solution of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$



REFERENCE BOOKS

1. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language Book Society) Longman. 5th Ed.
2. 'Analytical Chemistry' by Dhruva Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
3. 'Analytical Chemistry' by Gary D. Christian, 4th Ed., John Wiley & Sons.
4. 'Comprehensive Practical Organic Chemistry – Qualitative Analysis' by V. K. Ahluwalia, Sunita Dhingra University Press (India) Private Limited, Hyderabad, First Indian Reprint 2010.

5. *'Organic Analytical Chemistry theory and Practice'* by Mohan Jag, Narosa Publication, New Delhi. (2003).
6. *'Elementary Practical Organic Chemistry Part-2, Qualitative Organic Analysis'* by Arthur I. Vogel- CBS Publishers & Distributers, New Delhi. (2nd Ed., reprint 2004)
7. *'Advanced practical Organic Chemistry'* by J. Leonard, B. Lygo, G. Procter, Publication- Stanley Thornes (Publishers) Ltd. (First India

Shri Govind Guru University

BSC Semester – 2 Value Added Course (NEP-2020)

BSC23VA204 National Service Scheme

Unit 1 : Introduction , Basic Concepts and Activities of NSS

• Introduction of National Service Scheme • History & Philosophy of NSS • Basic Concepts: Objectives, Symbol, Motto, NSS Badge, NSS Songs, NSS Day • NSS Advisory Committees at various levels • Basic Concepts and Components • Various NSS Programme's and Activities • Aims of NSS Programme/Activities • Regular Activities & Special camping Programme • Orientation of NSS volunteers

Unit 2 : Health, Hygiene & Sanitization Programme's And Documentation

• Definition, Need and Scope of Health Education • National Health Programme's • Food & Nutrition • Safe Drinking Water, • First Aid, Healthy Lifestyle • Swachh Bharat Abhiyan • Preparation of documentation reports of NSS Activities. • Preparation of one day and annual camp report • Volunteer Diary • Socio Economy Survey Form for Adopted Village, Adopted Slum Area • Socio Economy Survey Data Collection, Analysis and Reporting.

Suggested References:

NATIONAL SERVICE SCHEME MANUAL

On-line Resources: <https://nss.gov.in/>