

SARDAR PATEL UNIVERSITY
Programme: B.Sc (Chemistry) Semester: IV
Syllabus with effect from: JUNE 2019
(30 +70 Marks, 4 hrs per week)

Paper Code: US04CCHE21	Total Credit: 4
Title Of Paper: Organic Chemistry	

Unit	Description in detail	Weighting (%)
I	<p>Stereochemistry Stereochemistry and stereoisomerism, Optical activity, Plane-polarized light, the polarimeter, Specific rotation, Production of Enantiomerism, Chirality, the chiral centre, enantiomers, the racemic modification, Configuration, Specification of configuration: R and S, Sequence rules, Diastereomers, Meso structures, Specification of configuration : More than one chiral center, Generation of a chiral center, Synthesis and optical activity, Reaction of chiral molecules: Bond-breaking, Reaction of chiral molecules: Generation of second chiral center, Reaction of chiral molecules with optically active reagent. Resolution, Reaction of chiral molecules: Mechanism of free radical chlorination.</p> <p>Free rotation about C-C single bond. Conformation. Torsional strain Conformation of n-butane Vander Waals repulsion, Factors affecting stability of conformation, Conformation of cycloalkanes, Equatorial and axial bond in cyclohexane.</p>	25 %
II	<p>(A)Alcohols & Phenols Alcohols Structure of alcohols, Classification of alcohols, Addition of Grignard reagent, Product of the Grignard synthesis, planning a Grignard synthesis, Synthesis using alcohol, Limitation of Grignard synthesis, Reaction of alcohols, Alcohols as acids and bases, Oxidation of alcohols.</p> <p>Phenols Rearrangement of hydroperoxides, Acidity of phenols, Kolbe reaction. Synthesis of phenolic acids, Reimer-Tiemann reaction,</p> <p>(B) Aldehydes And Ketones Reaction. Nucleophilic addition, Addition of cyanide,, Addition of alcohols. Acetal formation,, Acidity of α-hydrogens,, Base-promoted halogenation of ketones, Acid-catalized halogenation of ketones: Enolization, Aldol condensation, Dehydration of aldol products, Use of aldol condensation in synthesis, Crossed aldol condensation.</p> <p>© Amines: Diazotization,Sandmayer Reaction,Gattermann Reaction.</p>	25 %
III	<p>Carbohydrates Introduction, classification of carbohydrates, osazone formation, epimerization, step up(Killani Fisher Synthesis) and step down(Ruff Degradation) reactions of monosaccharides, simple structures of glucose and fructose, Fischer's proof of configuration of D-glucose,Cyclic structure of D(+) dlucose. Disaccharides, structure of (+) maltose, (+) cellobiose, (+) lactose</p>	25 %



IV	Chemical Reactivity and Molecular Structure: (Acid- Base Properties) Acid-Bases, scale of acidity-basicity, Resonance effect, drawing of structures and the condition for resonance, Effect of change of hybridization on acidity and basicity, Inductive and electronic effects, steric effect and hydrogen bonding, Lewis acid and bases, Keto – enol tautomerism . Difference between resonance and tautomerism.	25 %
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Basic Text & Reference Books :-

- A text book of organic chemistry by Arun Bahl and B. S. Bahl, 16th ed.
- Organic chemistry by Morrison and Boyd, 6th ed.
- Organic reaction mechanism by R.K.Bansal, 3rd ed.
- Organic chemistry by S.M.Mukherji, S.P.Singh and R.P.Kapoor. Vol. II.



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Programme: B.Sc (Chemistry)

Semester: IV

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Paper Code: US04CCHE22	Total Credit: 2
Title Of Paper: Analytical Chemistry	

Unit	Description in detail	Weighting (%)
I	Titrimetric Methods In Analysis Introduction, Definitions: Standard solutions, Equivalence Point, Indicators, End point, Titration General Aspects of: Primary standards, Desirable properties of standard solution. Volumetric calculations: Molarity, Normality, percentage concentration, parts per million. Neutralization Titration Standard solution and acid-base indicators. Titration curve for strong acid-strong base Systematic equilibrium concentrations for SA-SB titration. Acid-Base indicators, colour change range of an indicator, Indicator error. Determination of Acetic acid in vinegar. Determination of Alkalinity of soda ash.	25%
II	Complexometric Titration Introduction, terms involved in titration: complex, ligand, buffer solution, chelating agents, chelates, Some Chelating agents, Stability of complexes: stepwise formation constants. Complexometric titration curve. Equilibria involved in EDTA titration, Indicators for EDTA titrations. Hardness of water. Ca in Calcium Gluconate Sample. Numericals based on this titration.	25%
III	Redox Titration Introduction, Terms involved: oxidation, reduction. Single electrode potential, formal potential, Nernst Equation, Titration curve for Iron(II) and cerium (IV). Types of redox indicators and their selection. Structural chemistry of redox indicators. Numericals: Calculation based on emf of electrode/cell, end point calculations, equation constants.	25%
IV	Water Pollutants Analysis Water pollution: Introduction. Classification of water pollutants, Sources of water pollution. Origin of waste water, Effect of water pollutants, Water analysis: colour, turbidity, total dissolved solids, conductivity, acidity, alkalinity, hardness, chlorides, sulphates, fluorides. Drinking water standards.	25%

Basic Text & Reference Books:-

- Fundamentals of Analytical Chemistry, 7th Edition by Skoog, West, Holler.
- Quantitative Analysis 6th Edition - R.A. Day, Jr., A.L. Underwood.
- Analytical Chemistry –Dr. Alka Gupta, Pragati Prakashan.



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Programme: B.Sc (Chemistry)
Semester: IV
Syllabus with effect from: 2019
4 hrs per week)

Subject Code: US04CCHE23	Total Credit: 2
Title Of Subject : Chemistry Practical	

	Description in detail	
1	Binary Organic Mixture: [Solid + Solid] Only water insoluble (At least Ten) Separation and identification of binary organic mixture : Solid + Solid [A/B/P/N] Solid Acid : Benzoic Acid, Salicylic Acid, And Cinnamic Acid Solid Phenol: (α -naphthol, β -naphthol Solid Base : (O-m- & p-nitroaniline, Solid Neutral: p-dichlorobenzene, naphthalene, anthracene, benzamide, acetanilide, m-dinitrobenzene.	
2	VIVA	

Basic Text & Reference Books:-

- Vogel's Testbook Of Qualitative Organic Analysis
- An Advanced Course In Practical Chemistry By Ghoshal, Mahapatra & Nad

	Total Credit: 2
Title Of Subject : Chemistry Practical	

	Description in detail	
1	Gravimetric Analysis (single) 1. Ba as BaSO ₄ 2. Fe as Fe ₂ O ₃ 3. Al as Al ₂ O ₃ 4. Ni as Ni(DMG) ₂ 5. ZnCO ₃ as ZnO 6. BaCl ₂ · 2H ₂ O as BaCl ₂	
2	VIVA	

Basic Text & Reference Books:-

- Vogel's Testbook of Quantitative Chemical Analysis, 5th Edition By G.H. Jeffery, J. Basset, J. Mendham, R.C. Denney.
- Practical Chemistry By O.P. Pandey, D.N. Bajpai & S. Giri

