

20PEB122					CHEMISTRY					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	0	4	4	25	50	25	-	-	100

### COURSE OBJECTIVES

- Demonstrate the fundamentals of physical and organic chemistry.
- Imbibe reaction mechanisms into graduates
- Improve analytical skills of graduates
- Improve skills to synthesize chemicals/catalyst.

#### UNIT I

Hours: 10

**Physical Chemistry:** Reactions and Mechanisms; Surface Chemistry: Interparticle forces, adsorption isotherms, determination of the surface area of fine powders using BET theory, surface films; Colligative Properties and their Experimental Determination: Boiling Point Elevation, Freezing Point depression, Osmotic Pressure

#### UNIT II

Hours: 10

##### Organic Chemistry:

Organic reactions and their mechanisms: types of organic reactions; general methods of obtaining mechanisms, study of ionic, free radical and other reactions, Alkanes, Alkenes, Alkynes; Markovnikov's rule; Peroxide effect; Bayer's test; Monohydric alcohols; Saytzeff rule; Methods of distinguishing the three classes of alcohols; Aldol condensation; Clemmensen reduction; Wolf-Kishner reduction; Haloform reaction; Cannizzaro reaction; Reformatsky reaction; Wittig reaction; Saturated monocarboxylic acids; Hell-Volhard-Zelinsky reaction; Amino acid; Classification of carbohydrates; Monosaccharides; Mutarotation; Epimerization; Aromatics; Ruff degradation Aromaticity; Huckel rule; Electrophilic substitution reactions; Directive effects of substituents; Aromatic amino compounds; Carbylamines reaction. Organic Geochemistry.

#### Unit III

Hours: 10

**Marine Geochemistry:** Marine Geochemistry: Ocean as a chemical system: Salinity, Chlorinity, Density temperature: ocean circulation and structure of water: Sea water composition; Conservative elements; dissolved gases, CO<sub>2</sub> distribution etc; Upwelling phenomena; Carbonate dissolution and precipitation; Nutrient elements; Sources and sinks of Dissolved matter and organic Matter; Residence time

#### Unit IV

Hours: 9

**Organic Geochemistry and Isotope geochemistry:** Organic Geochemistry; A brief Biological background, Organic Compound and their nomenclature, Biologically important organic compounds; Carbohydrate, Lipids, Proteins, Introduction to isotope geology; Discovery of radioactivity and isotopes; Isotope in earth sciences; Nuclide types and their abundances; Decay mechanism of radioactive atoms; basic Principles of radiometric dating; Stable isotope Systematic: elementary knowledge about fractionation of stable isotopes; Stable isotopes and petroleum; mass spectrometry.

### COURSE OUTCOMES

On completion of the course, student will be able to

CO1- : Illustrate the fundamental concepts relevant to organic reaction mechanism.

CO2- Understand the basic concept of surface chemistry including analysis of BET surface area and colligative properties.

CO3- Analyse the synthesis and properties of Hydrocarbons (alkane, alkenes and alkynes), monohydric alcohol, monosaccharides, amines, amino acids and aromatic compounds.

CO4- Demonstrate the mechanism of important name reactions.

CO5- Explain the basic and fundamental concepts of marine chemistry.

CO6- Evaluate the principles of organic and isotope geochemistry including important biologically organic compounds.

### TEXT / REFERENCE BOOKS

1. Finar I.L., "Organic chemistry" Vol-I, 6th Edition, Pearson Education, 2002.
2. Sharma B.K., "Industrial Chemistry", 12th Edition, Goel Publishing house, 2001
3. Atkins, Peter, 'Physical Chemistry', 8th ed New Delhi : Oxford & IBH Publishing House, 2006.
4. Faure G, "Principles of Isotope Geochemistry"
5. Killips and Killips, "Introduction to organic Geochemistry"
6. White, "organic Geochemistry"
7. "Treatise on Geochemistry", 10 volume set, 2006

### END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 10 Questions of 2 marks each-No choice

20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks

80 Marks