

SARDAR PATEL UNIVERSITY
F.Y.B.Sc. [Semester-II]
Syllabus of FSCH-201 (ORGANIC CHEMISTRY)
(02 Credits)
(Effective from June-2010)
Total Marks: 100 [70+30]

UNIT 1 ALKANES AND CYCLOALKANES

[07 hrs]

Introduction, Preparation of Alkanes, The Grignard reagent: An organometallic compound, Coupling of alkyl halides with organometallic compounds, Mechanism of halogenations, Orientation of halogenations, Stability of free-radicals, Nomenclature of selected bicyclic and tricyclic systems, Reactions, reactions of small ring compounds, Baeyer strain theory, Heat of combustion & relative stabilities of cycloalkanes, Orbital picture of angle strain.

UNIT 2 ALKENE AND ALKYNE

[08 hrs]

Dehydrohalogenation of alkyl halide, The E2 mechanism, Evidence for the E2 mechanism. Evidence for the E2 mechanism. Absence of hydrogen exchange, Evidence for the E2 mechanism. The element effect, The E1 mechanism, Heat of hydrogenation & Stability of alkene, Electrophilic addition; Mechanism Electrophilic addition; Orientation & reactivity, Mechanism of addition of halogen Halohydrin formation, Addition of alkene; Dimerization, Addition of alkane; Alkylation Oxymercuration-demercuration, Hydroboration-oxidation, Free-radical addition. Mechanism of peroxide-initiated addition of HBr, Orientation of Free-radical addition, Hydroxylation Ozonolysis, Preparation of alkynes, Hydration of alkynes. Tautomerism Acidity of alkynes, Reaction of metal acetylides, Analysis of alkynes.

UNIT 3 ALKYL AND ARYL HALIDES

[07 hrs]

Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, S_N2 Reaction: Mechanism & kinetics, S_N2 Reaction: Reactivity & steric hindrance, S_N1 Reaction: Mechanism & kinetics, Carbocation, Structure of carbocation, Relative stability of carbocations, Stability of carbocations, Stability of carbocation: polar effect, Rearrangement of carbocation, S_N2 Vs S_N1 , Reaction, Low reactivity aryl and vinyl halides, Structure of aryl and vinyl halides, Nucleophilic aromatic substitution, Bimolecular displacement for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Elimination-Addition mechanism, Benzynes, Problems.

UNIT 4 BENZENE AND THEIR DERIVATIVES

[08 hrs]

Aromatic character. The Huckel $[4n+2]$ rule, Effect of substituent group. Determination of relative reactivity, Classification of substituent group, Mechanism of nitration, Mechanism of sulphonation, Mechanism of Friedal-Craft alkylation, Preparation of ketones by Friedal-Craft acylation, Mechanism of halogenations, Reactivity and Orientation, Theory of reactivity, Theory of orientation, Electron release via resonance, Effect of halogen on electrophilic substitution Aromatic-Aliphatic hydrocarbon, Structure & Nomenclature of arenes & their derivatives, Preparation of alkyl benzenes, Limitation of Friedal-Craft alkylation, Reaction of alkylbenzene, Oxidation of alkylbenzenes, Halogenation of alkylbenzene: ring Vs side-chain, Side-chain halogenation of alkylbenzene, Preparation of alkenylbenzenes, Reactions of alkenylbenzenes.

Reference Book:

1. Organic Chemistry by Morrison & Boyd 6th Edition.
2. Organic Chemistry by Paula Yurkanis Bruice, Pearson Education Asia.

SARDAR PATEL UNIVERSITY
F.Y.B.Sc. [Semester-II]
Syllabus of FSCH-202 (PHYSICAL CHEMISTRY)
(02 Credits)
(Effective from June-2010)
Total Marks: 100 [70+30]

UNIT 1 Gaseous State [08 hrs]

Kinetic Molecular Theory of Gases, Deviation of Real Gases from Ideal Behaviour, Effect of Temperature and Explanation for the Deviations, Van der waal's Equation of State, Discussion of Van der Wall's Equation, Boyle Temperature, Critical Constant of Gas, Determination of Critical Temperature, Pressure and Volume, Van der waal's Equation and the Critical States, Numerical Problems.

UNIT 2 The Liquid State [07 hrs]

Vapour Pressure, Isoteniscopic method, Surface Tension and Surface Analysis, Effects of Temperature on Surface Tnesion, Capillary rise method an Double Capillary rise Method, Viscosity, The Ostwald's Viscometer Method, Effects of Temperature on Viscosity, Reynolds Number, Refractive Index and its Measurements

UNIT 3 Chemical Thermodynamics [08 hrs]

Terminology of Thermodynamics, Work and Heat, Internal Energy and First Law of Thermodynamics, Measurements of ΔE and ΔH , Hess's Law and its Applications, Heat Capacity and Temperature Dependence of ΔH , Numerical Problems.

UNIT 4 Chemical Kinetics [07 hrs]

Differential Rate Laws, Integrated Rate Laws, Experimental Determination of Rate Laws, Reaction Mechanism and Elementary Process, Mechanism and Rate Laws, Reaction Rates and Equilibria, Temperature Effects, Numerical Problems.

Reference Book:

1. University Chemistry By Bruce H Mahan 4th Edition, Narosa Publishing House.
2. Principles of Physical Chemistry, Puri, Sharma and Pathania, 29th Edition S. Chand and Company.
3. Physical Chemistry By G. M. Barrow
4. Essential of Physical Chemistry by Bahl, Bahl and Tuli, 25th Edition, S. Chand and Company.

SARDAR PATEL UNIVERSITY
F.Y.B.Sc. [Semester-II]
Syllabus of FSCH-203 (Chemistry Practicals)
(02 Credits)
(Effective from June-2010)
Total Marks: 100 [70+30]

[A] Volumetric Analysis:

1. To determine the amount of carbonates and bicarbonates in mixture.
2. To determine the molarity and gm/lit of NaOH and Na₂CO₃ in mixture.
3. To determine amount of Fe⁺² by K₂Cr₂O₇ using diphenyl amine as an internal indicator.

[B] Organic Spotting:

Benzoic acid, Salicylic acid, β-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Acetone, Benzaldehyde, CHCl₃, CCl₄, Methanol, Toluene, Ethylacetate, Aniline, Benzamide, Nitrobenzene. The above compounds must be characterized by M.P. / B.P.

Reference Book:

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