

BACHELOR OF SCIENCE
Industrial Chemistry – Sardar Patel University
Semester-III
SUBJECT CODE: US03CICH21
TITLE: Chemical Process Principles & Engineering Materials
(04 Credits, 4 Hours; 70 External Marks & 30 Internal Marks)
(Effective from June 2019)

Unit: 1: Basis of calculation, Density & specific gravity, Units to express composition of systems, Ideal gas equation, Behavior of gaseous mixtures.

Material Balance: Elementary concept of unit operations and unit processes, Concept of mass balance and types of mass balance problems, Strategies and Guidelines for mass balance calculation, Mass balance calculations for processes-without and with chemical reactions, Recycle operation and purge operation, Bypass operation.

Unit 2: Energy Balance: Concept of Energy balance, Forms of energy, Energy balance for batch and continuous processes, Heat capacity and specific heat, Combustion and Calorific value of fuels, Combustion calculations.

Adsorption: Adsorbent and adsorbate, Chemisorptions and physical adsorption, Adsorption isotherms, Application of adsorption.

Unit 3: Material Sciences: Introduction s of material sciences, Classification of engineering materials, Engineering requirements of materials, Plan for selection of materials

Ceramic industries: Raw materials, Manufacturing of White wares, Structural clay products.

Unit 4: Cement: Portland cement, Other cements, Setting and hardening of cement, Manufacture and uses of ordinary cement.

Glass: Raw materials, Types of glasses, Manufacture and uses.

Metals and Alloys: Need, preparation, Mechanical & chemical properties, Applications, Composition of important metals and alloys- iron, copper, aluminium and their alloys

REFERENCE BOOKS:

1. Chemical Process Principles: (Part I), Haugen, Watson and Regatz (Asia Pub. House).
2. Stoichiometry : B. L. Bhatt & Vora S. M. (Tata McGraw- Hill Publication).
3. Basic Principles & Calculation in Chemical Engineering, David M Himmelblan (Prentice Hall Inc.)
4. Chemical Process Calculation (Stoichiometry), K. A. Gavhane (Nirali Prakashan-Pune)
5. Chemistry of Engineering Materials by C. V. Agrawal (Tara Publication)
6. Introduction to Chemical Engineering Thermodynamics (IV edition) by J. M. Smith & Vanness, (McGraw-Hill Co.)
7. Chemistry in Engineering and Technology, (volume I & II) JC Kuriacose & J. Rajarah (Tata McGraw Hill).
8. Chemistry of Engineering Materials By Jain & Jain. (Dhanpairai Publishing Co.).

BACHELOR OF SCIENCE
Industrial Chemistry – Sardar Patel University
Semester-III
SUBJECT CODE: US03CICH **22**
TITLE: ORGANIC CHEMISTRY
(04 Credits, 4 Hours; 70 External Marks & 30 Internal Marks)
(Effective from June 2019)

Unit: 1 Phenols, Alcohols, Ethers & Epoxides And Amines.

Structure, Nomenclature, Preparation, Physical properties, Salts of phenol, Acidity of phenols, Reactions. Alcohols: Structure, Classification, Nomenclature, Preparation, Physical properties, reactions, Alcohols as acids and bases, Synthesis using alcohols. Ethers - Structure, Nomenclature, Preparation, Physical properties, Reactions, Cyclic ethers. Epoxides - Preparation and reactions. Amines - Structure, Nomenclature, Preparation & Reactions, Salts of amines, Basicity of amines, Hoffman elimination, Analysis of amines, Diazonium salts -Synthesis, reaction and characteristics.

UNIT-2 Aldehydes, Ketones, Carboxylic Acids & their derivatives.

Structure, Classification, Nomenclature, Preparation, Physical properties, Reactions, Nucleophilic addition reactions, Base promoted halogenation of ketones, Acid catalyzed halogenation of ketones. Salts of carboxylic acids, Acidity of carboxylic acids, Effect of substituents on acidity, reactions of acid chloride, Acid anhydrides.

Unit: 3 Heterocyclic compounds.

Nomenclature of heterocyclic systems, five member heterocycles - Structure, source and electrophilic substitution reaction in Pyrrole, Thiophene and furan. Six membered heterocycles - Structure and source of pyridine compounds, nucleophilic and electrophilic substitution reaction in pyridine, basicity of pyridine, reduction of pyridine.

Unit: 4 Polynuclear hydrocarbons. Introduction, Nomenclature, Structure, Preparation and Reactions of Naphthalene, Anthracene and Phenanthrene.

REFERENCE BOOKS

1. Chemistry of carbonyl compounds by Cautsche – Prentice Hall.
2. Organic Chemistry by M. K. Jain and S. C. Jain (Shoban Lal Nagin Chand & Co. Educational Publishers, Jalandhar).
3. Organic Chemistry by Robert T. Morrison and Robert T. Boyd (VIth Edition, Prentice Hall of India Pvt. Ltd. New Delhi).
4. Organic Chemistry by R. K. Bansal (Tata McGraw – Hill Publishing Co. Ltd. New Delhi).

BACHELOR OF SCIENCE
Industrial Chemistry – Sardar Patel University
Semester-III
SUBJECT CODE: US03CICH23 – LABORATORY
(04 Credits, 4 Hours; 50 External Marks)
(Effective from June 2019)

Cement and its raw-material analysis, experiments for material balance calculations, Titration, Experiments based of Adsorption phenomena.

BACHELOR OF SCIENCE
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Semester-III
SUBJECT CODE: US03CICH24 – LABORATORY
(04 Credits, 4 Hours; 50 External Marks)
(Effective from June 2019)

Organic Spotting: a binary mixture, separation, identification and derivatives preparation. Experimental based on lab skill enhancement for preparation of laboratory (Preparation and Standardization of laboratory solution). Synthesis of simple hetrocyclic compounds.