

BACHELOR OF SCIENCE
Industrial Chemistry – Sardar Patel University
Semester-IV
SUBJECT CODE: US04CICH21
TITLE: Chemical Plant Utilities
(04 Credits, 4 Hours; 70 External Marks & 30 Internal Marks)
(Effective from June 2019)

Unit: 1

Water- Impurities and hardness of natural water, Water for steam making and industrial processes, Boiler water treatments, Calculations on water treatments.

Fuels-classification, advantages and disadvantages, Analysis of fuels, heating media

Unit: 2

Compression equipment's, Reciprocating compressor, Work of single stage reciprocating compressor, Effect of clearance, Volumetric efficiency, Multistage compression, Refrigeration, COP & refrigerating effect, Industrial refrigerants, Carnot and other refrigeration cycles.

Unit: 3

Internal combustion engines and external combustion engine, Steam power plant, its working, Otto engine and Diesel engine.

Steam boilers – Their classification, Steam generation, Conditions of steam, Steam table.

Unit: 4

Corrosion: Theories of corrosion, Corrosion reactions, Special corrosions, Factors affecting corrosion rate, Protection against the corrosion

Refractory: Classification, Properties and manufacture of important refractory, Their selection and failure.

REFERENCE BOOKS:

1. Chemical Process Principles: (Part I), Haugen, Watson and Regatz (Asia Pub. House).
2. Fuels and combustion, S. P. Sharma and Chandra Mohan Tata Mc Graw.
3. Fuels and Combustion, Samir Sarkar, Orient Longniur Ltd.
4. Chemistry of engineering materials by C.V. Agraval, Tara Publications.

SARDAR PATEL UNIVERSITY

BACHELOR OF SCIENCE
Industrial Chemistry – Sardar Patel University
Semester - IV

SUBJECT CODE. - US04CICH **22**

TITLE: Analytical Chemistry
(04 Credits, 4 Hours; 70 External Marks & 30 Internal Marks)
(Effective from June 2019)

Unit: 1

Titrimetric Methods of Chemical Analysis, General principle of titrimetry, Types of reactions in titrimetry, Standard solution, Basic requirements of titrimetry, Equivalence point and end point, Aqueous Acid Base Titrations. Concept of acid base titration, Titration curves, Acid-base indicators, Titration Feasibility and its applications. Non-aqueous Acid-base Titrations. Role and properties of solvents, Titrations in non-aqueous solvents.

Unit: 2

Redox Titrations: Introduction, Redox systems, Redox potential, Nernst equation, Equilibrium constant, Titration curve & feasibility. Iodometric and iodimetric titrations. Complexometric Titrations - Introduction, Stability constant, Ways of detecting end point, Titration curves, Types of EDTA titrations. Precipitation Titrations - Introduction, Feasibility and end point detection, Indicators, Factors affecting solubility of precipitates. Gravimetric Methods of Analysis - Principle of gravimetry, Requirements of precipitates, Formation and properties of precipitates, Coagulation & peptization, Co-precipitation and occlusion, Washing, drying and ignition of precipitate, estimation of Ni metal as Ni(DMG)₂.

Unit: 3

pH metry – Introduction, determination of pH & applications. Potentiometric titrations - Introduction, Types of titrations & Advantages of potentiometric titrations. Conductometric measurements - Introduction, Some important laws, Definition and relations, Effect of dilution, Applications of conductance measurements, Types of titrations, Advantages and disadvantages.

Unit: 4

Chromatography - Introduction, Classification and applications. Paper chromatography – Introduction, Experimental details for qualitative analysis. Thin layer chromatography – Introduction, Superiority of TLC over the other techniques, Experimental techniques, Scope & limitations. Column chromatography - Introduction, Experimental details, Theory of development, factors affecting column efficiency. GC & HPLC - Introduction, Instrumentation, Sampling methods, Experimental details and applications.

REFERENCE BOOKS

1. Instrumental methods of chemical analysis by Chatwal – Anand, Himalaya Publishing House.,
2. Instrumental methods of chemical analysis by B.K. Sharma, Krishna Publication Media (P) Ltd., Meerut.,
3. Analytical chemistry by Gray D. Christian, 4th edition, Wiley & Sons, Inc.,
4. Instrumental methods of analysis by Willard Merritt, Dean Settle, CBS Publishers & Distributors, New Delhi.,
5. Principles of instrumental analysis by Skoog, Holler, Nieman, Thomson Asia Pvt. Ltd., Singapore.,
6. Basic concept of analytical chemistry by S.M. Khopkar, New Age International Publishers.,
7. Instrumental methods of chemical analysis by Galen W. Ewing, McGraw – Hill Book Company.



SARDAR PATEL UNIVERSITY

BACHELOR OF SCIENCE

Industrial Chemistry – Sardar Patel University

Semester-IV

SUBJECT CODE: US04CICH23 – LABORATORY

(04 Credits, 4 Hours; 50 External Marks)

(Effective from June 2019)

Water analysis, Water purification and uses of Ion exchange resins, Fuels - Moisture content, Nitrogen content, Demonstration of boiler & its steam, Experiments based on various testing methods for corrosion.

BACHELOR OF SCIENCE

SEMESTER - IV

SUBJECT CODE: US04CICH23 – LABORATORY

(04 Credits, 4 Hours; 50 External Marks)

(Effective from June 2019)

Preparation of various solutions, its standardization for the estimation of metals and organic compounds. Experiments based on gravimetric, Complexometric, Iodometry & Iodimetry methods. Analysis of inorganic substance by semi micro qualitative analysis. pH and conductometric titrations. Experiments based on an applications of Chromatographic techniques.