

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester - 1st Semester B.E BranchCOMMON.....
Subject - Applied Chemistry Code - 300112
Total Theory Periods - 40 Total Tut Periods - 10
Total Marks in End Semester Exam 80
Minimum number of class tests to be conducted-2

Unit - I

Water: Specifications for water, analysis of water alkalinity, hardness. Water for domestic use, water softening processes - Lime - Soda process, Zeolite and ion exchange method, boiler feed water, boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, removal of silica, removal of dissolved gases, carbonate and phosphate conditioning, colloidal conditioning, calgon treatment, Numerical problems on Lime-Soda process, Zeolite and Ion exchange method.

[No. of Periods: 8+2]

Unit - II

Fuels: Classification, combustion and chemical principles involved in it, calorific value: gross and net calorific values and their determination by bomb calorimeter.

Solid Fuels: Proximate and ultimate analysis of coal and their importance, High and low temperature carbonization, Coke. Its manufactures by Otto Hoffman oven.

Liquid Fuels: Petroleum: its chemical composition and fractional distillation, knocking and chemical structure, octane number and cetane number and their significance, power alcohol, Analysis of flue gases by Orsat's apparatus, Numerical on calorific value, combustion, proximate and ultimate analysis of coal.

[No. of Periods: 8+2]

Unit - III

Corrosion: Types of corrosion (dry, wet, atmospheric, galvanic and concentration corrosion), theories of corrosion, protective measures against corrosion, factors affecting corrosion, pitting corrosion, water line corrosion, underground corrosion, stress corrosion, micro biological corrosion, corrosion fatigue.

Batteries and Battery Technology: Primary cells, secondary batteries reserve batteries, fuel cells, solar cells.

[No. of Periods: 8+2]

Unit - IV

Portland Cements Introduction, types of Portland Cement, methods of manufacturing (dry and wet process), properties of cement, 1haracterization of constitutional compounds of cement, ISI specification.

Lubricants: Classification of lubricants and mechanisms of lubrication.

Polymers: Industrial applications of thermoplastic, thermosetting, polymers, properties and applications of the major polymers viz polyethylene, Teflon, PVC, nylon, phenol formaldehyde. Elastomers, Natural Polymers.

[No. of Periods: 8+2]

Unit - V

Introduction to Important Industrial Chemicals:

Industrial Method of preparation (one each), properties and major industrial uses of following chemicals: Ammonium Chloride, Ammonium Nitrate, Ammonium Sulphate, Bromine, Calcium Phosphate (Monocalcium Phosphate, Super phosphate), Chromic Acid (Chromium trioxide, Chromic anhydride), Acrylonitrile, Benzene (Benzol), Butyl Acetate, Caprolactam, Carbon Tetrachloride, Cellulose Acetate, Cresol (Crysylic Acid), Chloroform (Trichloromethane), Ether (Ethyl Ether), Ethyl Alcohol (Ethanol, Industrial Alcohol), Glycerine (glycerol), and Melamine.

Explosives and Propellants:

Characteristics of Explosives, Oxygen Balance, Classification of Explosives: Primary or Initiating Explosives or Detonators; Low Explosives or Propellants; High Explosives, Preparation and Applications of Explosives, Rocket Propellants, Characteristics of a Good Propellant, Classification of Propellants.

[No. of Periods: 8+2]

Name of Text Books:

1. A Textbook of Engineering Chemistry by S.S. Dara (S. Chand and Company).
2. Engineering Chemistry by P.C. Jain (Dhanpat Rai publishing company)

Name of Reference Books:

1. Chemistry in Engineering and Technology (Vol-2) by J. C. Kuriacose, J. Rajaram (Tata McGraw Hill).
2. Engineering Chemistry by M.M. Uppal, Revised by S.C. Bhatia (Khanna Publishers).
3. Engineering Chemistry by B. K. Sharma (Krishna Prakashan).

PRACT. CODE - 300121

List of Experiments (Applied Chemistry)

1. To determine the percentage composition of a mixture of Sodium Hydroxide and Sodium Chloride.
2. To determine the amount of Sodium Carbonate in the given mixture of Sodium Carbonate and Sodium Bicarbonate.
3. Determine the amount of Oxalic Acid and Sulphuric Acid/Hydrochloric Acid in one litre of solution given standard Sodium Hydroxide and Potassium Permanganate.
4. To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.
5. Argentometric titration one each of Vohlard's method and of Mohr's method.
6. Complexometric Titrations Ca & Mg.
7. Determination of dissolved Oxygen in given sample of water.
8. Determination of calorific value of fuel by Bomb Calorimeter.

9. Determination of Flash Point and Fire Point of lubricant by Abels and Pensky Martin apparatus.

Name of the Text Books:

1. Laboratory manual on Engineering Chemistry by Dr. Sudha Rani (S. Chand and Company).
2. A Textbook on Experiments and Calculations in Engineering Chemistry by S.S. Dara (Dhanapat Rai Publishing Company Pvt. Ltd.).

Name of the Reference Books:

1. Vogel's Textbook of Quantitative Chemical Analysis (Latest ed.), Revised by G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney.
2. Applied Chemistry: Theory and Practice (Latest ed.), by O.P. Vermani and A. K. Narula.