

## Engineering Chemistry

### Unit I

#### Water Analysis & Treatment:

Sources, Impurities, Hardness & its units, Industrial water Requirement & characteristics, softening of water by various methods (L.S., Zeolite, ion exchange resin), Boiler trouble (carry over, scale and sludge, caustic embrittlement) Boiler corrosion causes, effect & remedies, internal treatments to boiler feed water. Characteristics of municipal water & its treatment, water analysis (determination of alkalinity, temporary and permanent hardness by complexometry, D.O., B.O.D., C.O.D) Numerical problems based on water analysis and water softening processes.

### Unit II

#### Fuels & Combustion

Fossil fuels & classification, Calorific value, Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC engine fuels, Diesel engine fuels, **Cetane number**, combustion and it related numerical problems.

### Unit III

#### Lubricants

Introduction, Mechanism of lubrication, Classification of lubricants, Lubricating oils, grease & semisolid lubricants, solid lubricants, synthetic lubricants, Properties and Testing of lubricating oils, Viscosity & Viscosity index, flash and fire points, cloud and pour point, Anline value, Steam Emulsion Number, Neutralisation No., Saponification Value, Iodine value, carbon residue); Numerical problems based on Viscosity Index.

### Unit IV

#### Polymer

(Fibers, Rubbers & Elastomers, Plastics), Introduction, Classification, Types of Polymerisation, synthetic Nylon, Decoran, polyvinyl, Polyacrylates their manufacture. Natural rubber, Vulcanisation of rubber .

**Elastomers-** Styrene rubber(GR-S) and Nitrile rubber(GR-A), Neoprene, Butyl rubber, thiocols, Ployurethanes; **Plastic-** Classification, Thermoplastic & Thermo setting plastics, Polythene, PVC, PVA, polyacrylates, Acrylonitrils, phenol fomaldehyde resins, urea formaldehyde resin & silicone resin. Flow sheet manufacturing diagram of Nylon 6: 6 & Decoran.

## Unit V

### (A) **Instrumental Techniques in Chemical Analysis**

Introduction of spectroscopy ,(IR,UV-Visible), Chromatography- Gas Chromatography, Calorimetry, Lambert's and Beer's Law

### (B) **Cement:** Portland Cement, Manufacturing, Setting & Hardening, Plaster of Paris ( Preparation properties & uses)

### (C) **Refractory:** Definition, Classification and important properties of refractories.