CHEMICAL ENGINEERING

Including Polymer Technology

UNIT-I : Momentum Transfer :-

Concepts of fluids, Dimensions and units, Basic principles of fluid state, Viscosity, Application of manometry, Newtonian and Non-Newtonian fluids, Flow of fluids- Laminar and Turbulent flow- Reynold's experiment and Reynold's number, Flow measuring devices, Bernoulli's theorem and applications, Fluid flow machineries, Valves, Centrifugal and reciprocating pumps and their characteristics, Compressors, Blowers and Fans.

1 x 20 = 20Marks

UNIT-2 : Unit operations :-

Heat transfer – Conduction, Convection, Radiation, Surface co-efficient and overall co-efficients, Natural and Forced convection, Heat transfer to Boiling liquids, Condensation, Heat transfer equipments.

Mass Transfer – Principles and types of diffusion, Fick's law of diffusion, Distillation-Principles and types, Drying- Definition of terms- equilibrium moisture, Bound moisture, Unbound moisture, Free moisture, Drying equipments.

1 x 20 = 20 Marks

UNIT-3 : Chemical Process Calculations :-

Units and Dimensions, Fundamental quantities and derived units, merits of SI system of units, conversion of units, Basic concepts of chemical calculations- gram atom, gram mole, Use of molar units, Methods of expression of composition of solids, liquid and solutions-Weight percent, Volume percent, Mole fraction, Mole percent, Equivalent weights, Normality, Molarity, Molality, Material balance- Steady state material balance equations, material balance calculations without chemical reactions.

1 x 10 = 10 marks

UNIT-4 : Instrumentation and Process Control :-

Process variables, Static and dynamic characteristics of process instruments, measurement of temperature, pressure, level, density, humidity and pH.

Principles of Automatic process control, On-off control, Proportional, Derivative and PID control, Control mechanism, Working principles of Pneumatic controllers, Electrical and Electronic controllers, Types of Control valves.

1 x 20 = 20 Marks

UNIT-5 : Physical Chemistry :-

Atomic weight, Equivalent weight of elements, Definitions and determination of Equivalent weights, Concepts of Enthalpy, Enthalpy of reactions, formation. Solution, combustion, neutralization and Phase changes, Law of conservation of energy, Hess's law of Heat summation, Chemical Equilibrium, Constant, Free energy change, Standard free energies, Avogadro's number, Chemical Kinetics, and Molecularity of reactions, Electrochemistry-Acid and Bases and their properties.

1 x 10 = 10 marks

UNIT-6 : Organic Chemistry :-

Aliphatic hydrocarbons, Saturated and Unsaturated, Properties, preparation and uses of Methane, Ethane, Ethylene, Acetylene, Homolog series, Isomerism, Chain position, Functional, CIS and IUPAC system and System of naming Organic compounds, Hydrocarbons, Petroleum refining and Cracking.

1 x 10 = 10 Marks

UNIT-7 : Mechanical Operations :-

Purposes of agitation, Impellers, Propellers, Paddles, Turbines, Swirling and Vortex formation and their prevention, Mixing Equipments.

Principles of Conveying, Types of Conveyors, Conveyor Accessories, Fields of applications.

Size reduction- Principles and applications, Crushers- Jaw crusher, Grinders- Ball mill, Ultrafine grinders, Hammer mill, Fluid energy mill.

1 x 10 = 10 Marks