Chemical Technology

DIPLOMA STANDARD

UNIT I
CHEMISTRY:
Atomic weight and number - Molecular weight - equivalent weight - periodic table - Normality - Molarity - Molality - Purification of organic compounds - Isomerism - Halogen compounds - alcohols - aldehydes and ketones - Boyle's law - Charles law - General gas equation PV = n RT - Dalton's law of partial pressures - Avagadro's law and Avagadro's number - Law of mass action - Application of law of mass action - Lechatlier's principle.

UNIT II
INORGANIC CHEMICAL TECHNOLOGY:
Sources of water - Hardness of water - water treatment by lime soda and ion-exchange process - acids - Raw materials, reactions and uses of Sulphuric acid, Hydrochloric acid and Phosphoric acid - Alkalis - Raw materials, reactions and uses of caustic soda, soda ash - fertilizers - raw materials, reactions and uses of ammonium sulphate, ammonium chloride, ammonium nitrate, urea, NPK fertilizers - raw materials of cement, glass manufacture - constitutents of paints - lacquers and varnishes.

UNIT III
ORGANIC CHEMICAL TECHNOLOGY:
Chemical composition of edible oils - distinction between oils and fats - definition of acid value, saponification value and iodine value - definition of detergents and soaps - composition of sugarcane and cane juice - raw materials for paper - pulp - chemical recovery from spent cooking liquor - raw materials, reactions and uses of ethyl alcohol - citric acid and vinegar - petroleum - crude oil distillation - principles involved in isomerism and alkylation - polymer - addition polymerization - condensation polymerization - thermoplastics and thermosets - raw materials, reactions, structure and uses of polyethylene, polypropylene, polystyrene, poly vinylchloride, nylons, phenolic formaldehyde, urea formaldehyde, melamine formaldehyde, epoxy resins and poly urethanes.

UNIT IV
BASIC ENGINEERING:
Stress - strain - elastic constants and their relations - friction - transmission of motion and power - properties of steam, boilers - electrical quantities and units - ohm's law - Kirchoff's law and Faraday's law - D.C. and A.C circuits - principle and working of D.C. Generator and D.C. motor - three phase transformer - principle and working and construction of A.C Generator - principle and working of vacuum diode, triode - semi conductor diode and transistor - uses.

UNIT V
INDUSTRIAL MANAGEMENT AND POLLUTION CONTROL:
Terms of economics - wants - goods - utility - demand - supply - value - price - law of diminishing - marginal utility - law of demand - law of supply - market - different types - location of an industry - Government financial Institutions providing financial aids and loans - procedure to get imported raw materials and machineries - principles of management - labour legislation Act - Trade Union Act - Industrial Dispute Act - Factory Act - Responsibilities and duties of foreman - safety practices - pollution - sources of air pollution and control of air pollution - Green House effect - Acid rain - Industrial wastes and solid wastes disposal methods.

UNIT VI
FLUID MECHANICS AND INSTRUMENTATION:
Compressible and incompressible fluids - manometers - U-Tube and inclined tube manometers - Reynolds number - continuity equation - Bernoulli's energy theorem - Laminar and turbulent flows - pipe fittings and joints - valves - positive displacement pumps - reciprocating pumps - rotary pumps -

centrifugal pumps - characteristics of centrifugal pumps -Installation and maintenance of pumps - priming and cavitation - fans - blowers and compressors.

Process Instruments - process variables - static and dynamic characteristics of instruments. Instruments for measuring pressure temperature, flow, PH, Principles and modes of control.

UNIT VII
HEAT TRANSFER:

Steady state and Unsteady state conduction - Fourier's law of conduction - thermal conductivity - analogy between heat transfer and electricity - natural and forced convection - Individual and overall heat transfer co-efficients - Radiation - Kirchoff's law and Stefan Boltzmann law - Definitions of Black body - gray body - Absorptivity - emissivity - principles and operations of double pipe heat exchanger, shell and tube heat exchanger, forced circulation evaporator, long tube vertical evaporator - evaporator economy, multiple effect evaporator - principles of refrigeration - refrigerants and their characteristics.

UNIT VIII
MECHANICAL OPERATIONS:

Ways of size reduction - Energy required for size reduction - laws of crushing - principle snd working Jaw and Roller crushers, ball mill and fluid energy mill - angle of nip-particle size determination by microscopic method - sieve standards - differential and cumulative screen analyses - screen efficiency - applications of belt conveyor, screw conveyor, bucket elevator - pneumatic conveyor - principle and operation of gravity thickener - principle and applications of plate and frame filter press, leaf filter, rotary drum filter - filter medium and filter aids - principle and application of centrifuge, cyclone seperator and electostatic seperator and Banbury mixer, Ko-kneader and ribbon blender - principles and applications of dialysis - reverse osmosis.

UNIT IX
MASS TRANSFER OPERATIONS:

Fick's law of diffusion - definitions of absolute and molal humidity - dry and wet bulb temperature - relative humidity - Raoult's law applications - Batch distillation - Rayleigh's equation - calculation of no. of trays by Mccabe - Thiele method - principle and application of steam distilation - molecular distillation - azeotropic distillation - extractive distillation - choice of solvent for absorption - characteristics of packings - random and regular packings - loading and flooding of packed towers - principles of liquid - liquid extraction - use of triangular charts - choice of solvent for extraction - mechanism of drying - critical moisture content - principle and applications of rotary, drum, spray and tunnel driers - principles of crystallization - principles of leaching and absorption - applications.

UNIT X
STOICHIOMETRY AND CORROSION:

Basic concepts of chemical calculations - gram atom and gram mole - methods of experessing the compostition - weight percent - volume percent - mole percent - mole fraction - material balance - Definitions of terms, tie-substance, inert material, excess reactant and limiting reactant - percentage conversion and yield - simple problems - combustion - Gross and net calorific value - theoretical air requirement - percent excess air - orsat analysis - Definitions and simple problems in heat of formation, heat of combustion, heat of reaction - different types of corrosion - galvanic corrosion - pitting corrosion - stress corrosion and corrosion control by cathodic and anodic protection - surface coatings.