

Paint Technology (PAPER –I)

(a) Introduction to Surface Coatings and their Components

Surface coatings, Essential mineral and fixed oils, Modification of oils, Coating driers, Volatile solvents and other components, Safety, Health and environmental aspects.

(b) Material and Energy Balance in Paint technology

Gas law, Material balance without chemical reactions, Material balance with chemical reactions, recycle/bypass/purge calculations, Energy balance calculations, Heat of reaction.

(c) Fluid Flow Solid handling, Instrumentation and Control in Paint technology

Properties of fluids, Newtonian and Non-Newtonian fluids, Laminar and turbulent flows, Equation of continuity, Bernoulli's theorem, Free and hindered settling Flow meters, Pressure drop due to friction, Reynold's Number, Friction factor and pipe roughness, Pumps, Agitation and mixing, Free and hindered settling, Measuring instruments for level, pressure, flow, temperature, concentration. Laplace transforms, Transfer functions of first and second order systems, Block diagram representation, Controllers and their transfer functions.

(d) Technology of Inorganic Pigments and Extenders

Pigmentary properties, Inorganic prime pigments, Extender pigments, White and black pigments, Colour pigments.

(e) Technology of natural resins, alkyds and polyesters

Natural resins and their modification, Natural polymers and their modification, Introduction to synthetic polymers, Alkyd resins, Hydrocarbon and other resins.

(f) Technology of synthetic resins and polymers

Formaldehyde resins, Epoxy resins, Polyurethane resins, Silicone resins, Ethylene resins.

(g) Technology of organic functional and effect pigments

Colour phenomena, Industrial organic pigments, Classical AZO pigments, Metallic, functional and effect pigments, High performance and composite effect pigments.

Paint Technology (PAPER –II)

(a) Heat and Mass transfer in Paint Technology

Fundamental laws of conduction, convection and radiation , Co-current and counter current operations, Log mean temperature difference (LMTD), Different heat exchangers and their calculations, Molecular diffusion, Fick's law of diffusion, Mass transfer coefficients, Basics of distillation and extraction, Humidification and dehumidification.

(b) Characterization, Analysis and Evaluation of Coatings

Analysis of coatings and classification of their properties, Optical properties of coatings and complete application in colour development, Quality control, Physical, chemical and mechanical properties of coatings, Weather resistance and ageing properties of coatings.

(c) Technology of Formulation and Manufacture of Coatings

Coating additives and principles of coating formulation, Principles of coating manufacture, Heavy duty machines and ball mills, Attritors and high speed machines , Production planning, Factory lay-out, Safety health & environment , Computers and modeling in paint resin formulation.

(d) Technology of Surface Preparation, Treatments and Coating Application

Methods and equipments of surface preparation, Pretreatment and conversion coating, Coating application and electro-deposition, Curing of film, Effluent treatment, Waste management, Paint shop services, Paint defect and paint remover, Different paint additives and their role in paint technology, Packaging in paint technology.

(e) Technology of Printing inks

Printing process and nature of printing inks, Raw materials for printing inks , Testing and evaluation, Different types of inks for diverse industrial applications, Mixing and milling equipments, handling and storage.

(f) Technology of Industrial , automotive and specialty coatings

Clear finishes, primers and marine coatings, Appliance and heavy duty coatings, Novelty finishes, fire retardant coating, Automotive protection products Finishing and refinishing, Electro-deposition coatings, UV curable coatings, Powder and specialty coating.

(g) Technology of Architectural and Eco friendly coatings

Introduction to eco system, Architectural aspect of eco-friendly coatings, Architectural coating systems, Eco-friendly coating. Corrosion and its control in paint technology.