

Harcourt Butler Technical University, Kanpur
Syllabus of “Paint Technology” for Written Test to the Post of Assistant Professor
(Contractual)

Surface Coatings and their Raw Materials

Classification of surface coatings, sources and composition of glyceride oils; molecular structure of tri-glyceride oils; constitution and molecular structure of fatty acids; evaluation & characterization of oils – physical and chemical; fatty acid composition and characteristics of individual oils; drying, semi drying and non-drying oils; properties and uses of glyceride oils. Deficiencies in oil films; chemical modifications of oils.

Constitution of coating Driers; active & auxiliary, primary and secondary; surface & through driers; properties and uses of individual driers; mechanism of drier action; manufacture of driers; evaluation of driers; combination of driers; drier dosage.

General classes of solvents, properties of solvents e.g. solvent (cutting) power, rate of evaporation, boiling point, distillation range, flash point, toxicity, aromatic content etc.

Resins and Polymers, Resinous State, Classification of Resins, Classification of Natural Resins, Sources, availability, processing and properties, and modifications of Natural Resins: Rosin, Shellac. Natural polymers and their modifications: cellulosic polymers, rubber resins.

Introduction to Synthetic Polymers: Functionality of molecules and its determination; Degree of polymerization and molecular weight; Non-convertible and Convertible film-formers, Thermoplastic and Thermosetting Resins. Raw materials, Manufacture, Properties, Applications in Surface Coatings of various Synthetic Resins: Alkyds, Polyesters, Epoxies, Polyurethanes, Vinyl and Acrylic resins, Silicone resins.

Definition and classification of pigments. General methods of manufacturing, properties and applications of natural and synthetic inorganic pigments and extenders; applications, merits and demerits of Nano pigments and extenders. Functional and effect pigments. Properties of pigments. Colour Phenomena, Industrial Organic Pigments, High Performance and Miscellaneous Pigments

Coating Additives: Definition, nomenclature, role, scope of incorporation, dosage, side/adverse effects of use of additives

Formulation and Manufacture of Coatings

Prerequisites, Mathematics & Steps; PVC, CPVC, LCPVC, RCPVC, % Volume solids, Relationship between PVC and film properties, Theoretical Covering Capacity, P/B ratio. Steps in Paint manufacturing, Phenomenon of Mixing, Soaking, wetting, grinding, dispersion and Stabilization. Thinning, Dilution shock and Filtration, Dispersion processes. Equipment used in paint manufacture and their functioning.

Testing of raw materials and paints

Testing of Pigments, Extenders, Oils, Resins, and Solvents. Testing of Liquid Paints. Evaluation of Paint films for physical, mechanical and optical properties. Chemical resistance, Corrosion resistance, Weather resistance and aging properties of paints.

Surface Preparation and Coating Applications

Different Steps involved in Mechanical and Chemical pretreatment of surfaces. Different application techniques: Conventional Air-spray, Airless and Electrostatic Spray, Electrodeposition. Common paint defects their prevention & cure. Recent trends in surface coatings and application techniques. Safety & health hazards in Paint industry.