

**DETAILED SYLLABUS FOR THE POST OF  
WORKSHOP INSTRUCTOR/INSTRUCTOR GR.II/DEMONSTRATOR/  
DRAFTSMAN GR.II IN POLYMER TECHNOLOGY  
(TECHNICAL EDUCATION)**

**(Cat.No. : 675/2022)**

**(Total Marks- 100)**

**MODULE 1- POLYMER SCIENCE (10 MARKS)**

Definition of Monomer, Polymer and Oligomer, Monomer - examples, Functionality- Mono functionality, difunctionality and poly functionality - examples , Degree of Polymerization , Classifications of polymer- Natural and Synthetic -Thermoplastic- Thermoset - Crystalline and amorphous polymers, Homopolymer, Copolymer - Organic & Inorganic, Different types of Copolymers- Examples, Types of Polymerization - Addition and Condensation polymerization, Polymerization techniques - Bulk, Solution, Suspension and Emulsion, Uses of different plastics, fibres and rubbers.

**MODULE II - NATURAL RUBBER (10 MARKS)**

Natural rubber, structure and properties, Propagation methods - brown and green budding - Clones- types of clones, Tapping-Ladder, slaughter and puncture tapping, Yield stimulants and rain guarding, Composition of latex, Latex preservative systems- long and short term, Concentration of NR latex - creaming, centrifuging, BIS specification of centrifuged latex, Marketable forms of NR- RSS, ADS, Crepe rubbers, ISNR.

**MODULE III -SYNTHETIC RUBBERS (10 MARKS)**

General purpose rubbers- SBR, BR, IR, IIR, EPM and EPDM. Monomer, polymerization, raw polymer properties, compounding, curing, vulcanizate properties and applications of general purpose rubbers.

Special purpose synthetic rubbers-NBR, CR, CSM, Silicone rubber, Polyurethane. Monomer, monomer, polymerization, raw polymer properties, compounding, curing, vulcanizate properties of special purpose rubbers.

**MODULE IV - RUBBER COMPOUNDING (12 MARKS)**

Rubber compounding, Compound, Base polymer, Compounding ingredients- Vulcanizing agents, Vulcanization systems, Activators, Retarders, Accelerators, Antidegradants, Processing aids. Fillers- reinforcing, semi reinforcing and non reinforcing, Special purpose additives-Blowing

agents, Flame retardants, Coupling agents, Factice, Principles of rubber compounding, Order of addition of different compounding ingredients in rubber mixing.

#### **MODULE V- LATEX TECHNOLOGY (10 MARKS)**

Difference between latex compounding and dry rubber compounding, Principles of latex compounding, different compounding ingredients used in latex, Method of preparation of dispersion and emulsion.

Latex products - Dry and wet coacervants, Dipping technique. Production of gloves, latex thread and latex foam

#### **MODULE VI- SPECIFICATION TEST FOR DRY RUBBER AND LATEX CONCENTRATE (10 MARKS)**

Specification test for ISNR - Dirt content, Ash content Volatile matter, Nitrogen content, Po and PRI

Specification test for latex concentrate- Principle and test procedure for TSC, DRC, Alkalinity, Specific gravity, Viscosity, MST, KOH number, VFA number, Sludge content, Coagulum Content.

#### **MODULE VII- PLASTICS MATERIALS ( 8 MARKS)**

Advantages of plastics over conventional material, Classification of plastics - origin and thermal response, Thermoplastics and Thermosetting Plastics, Manufacture, properties and applications of PE, PP, PVC, PMMA, PS, Nylon 66, PF, UF, Epoxy resin.

#### **MODULE VIII- POLYMER PROCESSING AND MACHINERIES (12 MARKS)**

Major Machineries used for polymer processing, Mixing equipments used in Rubbers- Two roll mill and internal mixer, Two roll mill- various parts and accessories, safety devices and important Uses, Banbury and Intermix- various parts and accessories, Fill factor.

Compression molding, Transfer molding, Injection molding, Blow molding, Reaction injection molding, Extrusion- hot feed and cold feed extrusion, extrusion of plastics, Calendaring- gauge compensation techniques, Rotational molding, Thermoforming

#### **MODULE IX - POLYMER CHARACTERIZATION (10 MARKS)**

Cure characteristics of compounded rubber- Mooney Viscometer and ODR. Scorch time, cure time. Determination of physical properties of plastics and rubbers. Physical testing- tensile strength, tear strength, hardness, abrasion resistance, resilience, compression set.. Testing of plastics- impact strength, melting point, VST, MFI.

#### **MODULE X- PRODUCT TESTING (8 MARKS)**

Importance of product testing, IS specification of important rubber products, Specification test for polymer products - Cycle tyre, Cycle tube, MC Sole, Latex foam, Footwear.

*NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper*