Central Analytical Facility, BMT Wing, SCTIMST, Trivandrum

MFCP - Technical Assistant (Instruments)

Syllabus for Written Test

Quality System and Testing: Testing under a quality management system, identification of test methods and method validations, competence monitoring methods, inter-laboratory comparisons, proficiency testing, statistical evaluation of test results, precision and accuracy, sensitivity and selectivity, limit of detection and quantification, primary and secondary standards, concentration of solutions, molarity and normality, buffers and their preparation, pH and conductivity, ISO 17025, accreditation requirements, Measurement uncertainty.

Spectroscopic Analysis of Materials: Electromagnetic radiations and their interaction with the materials.**FTIR**: Principle and instrumentation, qualitative and quantitative analysis of biomaterials, material identification. **UV-visible absorption**: Principle and instrumentation, analysis of biomolecules, nanomaterial analysis, drug loading and release kinetics, regression models. **Raman**: Principle and instrumentation, Types of scattering, material identification, Raman mapping.**Spectrofluorometry:**Principle and instrumentation, structural characterization, qualitative analysis, and quantitative estimation of emissive materials in solutions. **X-ray fluorescence Spectroscopy:**General principles, elemental composition and analysis, RoHS compliance testing, precious metal analysis, and coating thickness measurements.

Thermal Analysis of Materials: General principles of thermal analysis, **Thermogravimetric analysis**: Principle and instrumentation, compositional analysis of polymers and composites, **Differential scanning calorimetry**: Principle and instrumentation, Thermal transition of polymers such as T_m, T_g, and T_c.

Chromatographic Analysis: Various techniques of Chromatography, High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography, andGas Chromatography; stationary and mobile phases. Normal and reverse phase chromatography, amino acid, sugar, and drug analysis of bio-samples using HPLC.

Mechanical Testing: General principles of mechanical testing, mechanical test machines and types, Structure-property relationships of materials, Static and dynamic tests, Mechanical properties of tissues, membranes, and polymers and their evaluation.

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