

**SYLLABUS FOR THE POST OF SCIENTIFIC OFFICER - CHEMICAL SECTION IN
FORENSIC SCIENCE LABORATORIES (POLICE DEPARTMENT)
KARNATAKA STATE**

1. Introduction, definition, principles, scope and branches of Forensic Science.
2. Crime Scene Investigation: Definition of crime scene, Classification of crime scenes indoor & outdoor, primary & secondary, macroscopic & microscopic crime scenes, Significance of crime scene and ethics of crime scene investigation.
3. Physical Evidence: Definition, Classification, Sources, Significance and value of physical evidence. Linkage between crime scene, victim and criminal. Study of crime scenes relating to Gas explosions, Fire and arson, homicide, suicide, murder, mass disaster (Bomb blasts, Vehicle and Train accidents, Air-crash, Industrial accidents etc).
4. Chemical periodicity, main group of elements and their compounds, concept of acids and bases, hard soft acid base concept, non aqueous solvents, organometallic compounds-synthesis, bonding & structure and reactivity, characterization of inorganic compounds.
5. Qualitative analysis: Sample preparation, dissolution, digestion and fusion, Nature of trace analysis, spot tests and spectroscopic methods. Screening tests commonly engaged in chemical analysis of drugs samples.
6. Quantitative analysis: Volumetric and Gravimetric analysis.
7. Solvent extraction: Advantage and application, Derivation of the relation between the percentage extraction and number of extraction, relation between distribution ratio and distribution coefficient, quantitative treatment of neutral chelate in extraction systems, pH extraction curve, masking agent, salting out technique, single extraction verses multiple extractions, solid phase extraction, accelerated solvent extraction, ultrasonic extraction, heat reflux extraction.
8. Chromatography: Introduction, principle, procedure and applications of – Paper chromatography, Thin Layer Chromatography (TLC), High Performance Thin Layer Chromatography (HPTLC), Adsorption chromatography, Column chromatography, Gas Liquid Chromatography (GLC), Ion-exchange Chromatography, Reverse phase chromatography, High Pressure Liquid Chromatography (HPLC), Liquid chromatography-Mass spectrometry (LC-MS), Gas chromatography-Mass spectrometry (GC-MS).
9. Spectrophotometry - Basic principles, Beer-Lambert's Law. Principle and biochemical applications of UV-Vis spectrophotometry, atomic absorption spectroscopy. Theory and applications of IR, Fourier Transform Infrared spectroscopy (FTIR), Nuclear Magnetic Resonance spectroscopy (NMR) in the study of macromolecular structures, Raman spectroscopy, Mass spectroscopy.