

Annexure "A"**Marks : 120 Marks****Time: 02 hours****Assistant Scientific Officer, Chemistry & Toxicology**

- Introduction, Definition, Principles, Scope and branches of Forensic Science.
- Development of Forensic Science in India.
- Crime Scene investigation: Definition of Crime Scene. Classification of Crime Scene, Indoor & Outdoor, Primary & Secondary , Macroscopic & Microscopic Crime scenes, Significance and Ethics of Crime Scenes.
- Physical Evidence: Definition, Classification, Source, Significance and value of Physical evidence. Linkage between Crime Scene victim and Criminal. Study of Crime Scene relating to gas explosion, Fire and Arson, homicide, suicide, murder, mass disaster. Tools and techniques in Crime Scene search. Collection, Preservation, Packaging of the material at Crime Scene. Re-Construction of Crime Scene. Chain Custody and safety measures at the Scene of Crime and in Laboratory.
- Basic Principles of Statistics: Probability, Mean, Median, Mode, Chi square, F-Test, measurement of uncertainty, Systematic and random sampling
- Expert testimony in court of Law: Admissibility of evidence, Laws and Acts relevant to Forensic Science.
- Narcotic Drugs and Psychotropic substances, Introduction and Classification of Control Substances, Precursor Chemicals, Narcotic Raids and Drug Laboratories- Evidence and Forensic Examination, Mandatory Provisions of NDPS Act, NDPS Drugs, Classification of Drugs, Drug Dependence and Drug Tolerance.
- Explosive Chemistry- Introduction, Assessment, Classification and Chemistry of Explosives, Various Types of IEDs and their reconstruction, Mechanism of Explosion, Kinetics of Explosive reactions, Processing of Explosion Scene of Crimes – Role of Forensic Science, Role of Forensic Scientists in Post Blast Investigation.
- Forensic Drug Chemistry: Introduction to Drugs, Forensic Examination of the Drugs/ Narcotics. Sample Preparation, Extraction Techniques - Chemical colour Test, Microcrystal Techniques and other instrumental techniques.
- Petroleum Chemistry: Paraffins, iso-olefins, Olefin Hydrocarbons, Naphthalenes, Cycloparaffins, Aromatic Hydrocarbons, Sulphur Compounds, Nitrogen Compounds, Oxygen Compounds, Organo-Metallic Hydrocarbons, Physical Properties of Petroleum Products, Analytical Techniques: Quantitative and Qualitative Steps in Analysis of Petroleum.

- Fire Chemistry: Fire and Energy, Basic Chemistry, Chemistry and Behaviour of Fire, State of Matter and Behaviour of Gases, Liquids and Solids, Flammable limits.
- Basic Biochemistry: Amino acids, Lipids, Proteins, Carbohydrates.
- Forensic Toxicology Examination- Law relating to Poison, Introduction to Poisons, Forms of Poisons, Classification and methods of administration of poisons, Mode of action of Poisons, Diagnosis and management of Poison Cases, Factors effecting the affect of Poisons and medico legal aspects in Poison cases, Collection and Preservation of Biological evidences and circumstantial evidences in fatal and survival cases, Submission of samples to the laboratory, Specific analysis plan, isolation and extraction of Poison/ Drug by various methods using instrumental techniques.
- Basic Principles of Pharmacology and Forensic Pharmacology.
- Organo-metallic Chemistry.
- Lasers Photochemistry and Spectroscopy.
- Qualitative and Quantative Analysis: Solvent Extraction- Advantage and Applications- pH extraction, masking agents, salting out techniques, relation between distribution ratio and distribution coefficient, advantage and application of solvent extraction, quantitative treatment of neutral chelate in extraction system, single extraction versus multiple extraction, solid phase extraction, accelerated solvent extraction, ultrasonic extraction, heat reflux extraction.
- Chromatography: Introduction, principle procedure and applications, applications of paper chromatography, thin layer chromatography, high pressure thin layer chromatography, gas, liquid chromatography, Ion exchange chromatography, high pressure liquid chromatography, liquid chromatography-mass spectrometry, gas chromatography-mass spectrometry.
- Chemical Periodicity, Main Group of elements and their compounds, concept of acids and bases, Hard Soft acid base concept, Non aqueous solvents.

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