

Forensic Chemistry Syllabus

Section- C

Unit-1

Introduction, definition and scope of forensic chemistry, types of cases which require chemical analysis, Limitations of forensic chemistry. Conventional methods of chemical analysis, presumptive test (color/sport tests), Microcrystal test, Elemental analysis (organic and inorganic).Job of forensic drug chemist.

Unit-2

Analysis of Toxic Anions: Nitrite, Nitrate, Sulfide, Sulfate, halides, Cyanide. Analysis of Some Metallic Poisons: As, Sb, Pb. Ba. Cu. Hg. Zn, Thallium. Analysis of methanol, ethanol, denatured spirit, illicit liquor in biological fluids.Methanol and ethanol poisoning.Analysis of insecticide and pesticide.

Unit-3

Analysis of Alcoholic Beverages: Alcoholic and non-alcoholic beverages and their composition, Analysis of alcoholic beverages as per BIS and PFA Act. Detection and determination of ethanol, furfural, organic acids, aldehydes, chloral hydrate, methanol and ethylene glycol in liquors by colour test, TLC, GC and GC- MS methods distinction between licit and illicit liquors.

Unit- 4

Definition, classification, isolation from viscera and other biological fluids, general properties and examination of morphine, codeine, brucine, strychnine, atropine, heroin, cocaine, cannabis and Dhatura by various preliminary and instrumental methods.

Unit-5

Drugs of abuse: Introduction, drug addiction and its problems, classification of drugs of abuse, Depressants, stimulants, Hallucinogens, designer drugs, Identification Field tests and laboratory tests. Analysis of NDPS evidence by various procedures prescribed by U.N. Manual DFS manual, spot tests, microcrystal test, extraction methods, TLC, UV-Vis spectrophotometry, IR spectrophotometry, GC-HPLC, MS, GC-MS, NMR and XRD. Clandestine laboratory investigation, Drug abuse in sports: introduction common prohibited substances, analytical approach.

Unit-6

Chemistry of Combustion and Arson-Overview of Combustion, Four Aspects of Combustion (Thermodynamics, Kinetics of Combustion, Heat Transfer, Mass Transfer), Deflagration and Detonation.

Fires: Nature and Chemistry of Fire, Classification, Ignitors of Fires, Phases of Fires, Main Types of Fires, Examination of Scene of Fires

Arson: Relevant IPC Sections, Motives, Analysis of Accelerants, Scientific investigation and evaluation of clue materials, collection and preservation, analysis of fire debris residues, analysis if incendiary material from debris.

Unit-7

Analysis of petroleum products and residues: Distillation and fractionation, Various fractions and their commercial uses, Standards/methods of commercial analysis of petroleum products as per ASTM and BIS, Analysis of trace of petroleum products in forensic exhibits, Comparison of petroleum products, Adulteration of petroleum products, Characterization of petroleum products in oil spills, Application of conventional and Modern Techniques in the analysis of petroleum products. Examination of contact Traces: Introduction to cosmetics and detective dyes, collection, sampling and analysis.

Unit-8

Nature, classification, composition and characteristics of explosives, pyrotechnics, IEDs, explosion process and affects, types of hazards, effect of blast wave on structures, human etc., specific approach to scene of explosion, post blast residue collection, reconstruction of sequence of events, evaluation and assessment of scene of explosion, systematic examination of explosives and explosion residues in the laboratory using chemical and instrumental techniques and interpretation of results. Diffusing of live bombs.

Unit-9

Examination of Building Material: Types of Cement and their Composition, Determination of Adulterants by Physical, Chemical and Instrumental Methods, Examination of Brick, Analysis of Cement, Mortar and Cement, Concrete. Analysis of detergent and soap. Trap cases: purpose, examination of chemicals used in trap case.

Unit-10

Analysis of gunshot residues - mechanism of formation of GSR, source, collection, spot test, chemical test, identification of shooter and instrumental methods of GSR analysis. Analysis of gold and other precious metals in Cheating Cases. Analysis of dyes and pigments. Determination of adulteration in edible oils, food commodities, fertilizers and ornaments.

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