

SYLLABUS FOR COMPUTER BASED RECRUITMENT TEST (CBRT)
FOR THE POST OF SCIENTIFIC ASSISTANT IN FORENSIC SCIENCE
LABORATORY IN TOXICOLOGY, CHEMISTRY AND NARCOTICS
UNDER
GOA POLICE DEPARTMENT
(Adv 12 Year 2021)

- I. General English including Grammar - 10 marks**
- II. General Knowledge, Current Affairs and Events of National and International Importance - 10 marks**
- III. Logical Reasoning and Analytical Ability - 25 marks**
- IV. Core: - 30 marks**

General Chemistry:

Atoms, Molecules and mole concept, IUPAC nomenclature of organic Compounds. Principles of stereochemistry, conformation analysis, isomerism and chirality. Reactive intermediates and organic reactions mechanism. Concepts of aromaticity. Oxidation and reduction of functional groups. Chemistry of aromatic and aliphatic heterocyclic compounds. Explosives-Introduction, classification, composition, characteristics, chemistry of explosives, pyrotechnics, improvised explosive device, detonators, Deflagration and Detonation phenomenon.

Qualitative and quantitative aspects of chemical analysis, evaluation of analytical data, errors, accuracy and precision, methods of their expression, normal law of distribution, indeterminate errors. Optical methods of analysis: Origin of Spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules, validity of Beer- Lambert's law. Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence point. Techniques used for the determination of pKa values. Concept of Normality, Molarity and their calculations. Sample extraction techniques and removal of interference from sample extracts: Classification and principle and efficiency of the technique. Mechanism of extraction. Technique of extraction: batch, continuous and counter current extractions. Extraction techniques, such as headspace extraction, liquid liquid extractions (LLE), solid phase extraction (SPE) membrane – based extraction, micro extraction techniques, solvent extraction, pressurized liquid extraction (PLE), microwave assisted extraction (MAE), ultrasonication and supercritical fluid extraction (SFE).

Instrumentation method of chemical analysis: UV visible, I.R., FT-IR, Atomic absorption spectroscopy, Mass spectrometry. Raman spectroscopy, Neutron activation analysis, N.M.R. X-ray analysis, X-ray diffraction analysis, x-ray fluorescence analysis. Thermal techniques- TGA and DTA, Chromatography- Theory and techniques, Column, paper, TLC, Ion exchange. GC, HPLC, HPTLC, CG-MS and LC-MS. Theory and principles. High and low Voltage electrophoresis, gel electrophoresis, Immune electrophoresis. Radio analytical techniques and activation analysis. Various types of optical microscope, scanning electron microscope with energy dispersive X-ray analysis.

Toxicology: Definition, classification, mode of action, factors modifying mode of action of poison. Analytical classification of poison. Types of poisoning. Routes of administration ADME, pharmacokinetics, pharmacodynamics, LD₅₀, Biological half-life, Extraction and isolation of poison from biological specimen. Qualitative and Quantitative analysis of toxicants. Analysis of corrosive and irritant poisons, Anions and cations. Estimation of liquor in breath, blood and urine. Analysis of methanol ethanol, Acetone, chloroform, ether, Denatured spirit and methanol poisoning, analysis of CO and other Poisonous gases. Insecticide and pesticide and their analysis. Alkaloids- Definition, classification, isolation and general properties. Analysis of morphine, codeine, Brucine, Strychnine, Nicotine, atropine, hyosyamine, Cocaine. Datura Papavar

somniferum, atropa belladonna, marking nut, Nux vomica, Oleanader, Aconite, abrus, cannabis sativa, Coca, croton, snake venom and canthridine. Analysis of Barbiturates, Chloral hydrate, tranquilizers. Botulism, Ptomanine poisoning.

Narcotics: Narcotics Drugs and Psychotropic Substances- Introduction, Classification, drugs of abuse in sports, designer drug, Qualitative and quantitative analysis.

Note:

*** Duration for C.B.R.T : 90 Minutes**

***Maximum Marks for C.B.R.T : 75 Marks**

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