

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF SENIOR SCIENTIFIC OFFICER- NARCOTICS DIVISION (STATE FORENSIC SCIENCE LABORATORY, RAJASTHAN, JAIPUR)

Unit I

Analytical Chemistry: Classification of analytical methods – Classical and Instrumental, volumetric, titrimetric and gravimetric techniques, selection of proper analytical techniques: types and range of determination, accuracy, precision and errors, sample preparation, handling of reagents with safety, density and viscosity measurements.

Statistical Analysis: Mean, Mode, Median, Correlation and Regression analysis, Null Hypothesis, Variance, t-test, Chi-Square test. Type of Data, Measure of central tendency, Dispersion of Data, Correlation, Probability and Proof.

Unit II

Analysis of unknown samples :-

Organic: Physical examination, element detection (N, S, Cl, Br, I, F), Functional Group analysis (-OH, -COOH, -NO₂, -NH₂, -CONH₂, -CO-, -CHO, Hydrocarbons)

Inorganic: Qualitative analysis of cations and anions with special reference to cations i.e. As, Sb, Pb, Ba, Cu, Hg, Zn and Tl and anions i.e. NO₂⁻, NO₃⁻, S²⁻, SO₄²⁻, SO₃²⁻, halides and cyanides.

Analysis of poisonous gases: CO, H₂S, PH₃, CH₄ and NH₃.

Unit III

Spectroscopic and other techniques :-

Unifying principles : Electromagnetic radiation, interaction of electromagnetic radiation with matter- absorption, emission, transmission, reflection, refraction, dispersion, polarization and scattering.

Basic principles, instrumentation and applications: UV- Visible, FTIR, AAS, Mass, Spectroscopy, Fluorescence and Phosphorescence spectrophotometry, ESR Spectroscopy. Fundamentals of Acids, Bases and Buffers, pH, pK_a, and pK_b values, principles, instrumentation and applications of pH metry, Potentiometry, Conductometry and Microscopic analysis in forensic Science.

Unit IV

Chromatography and Electrophoresis : General Principles and types of chromatographic techniques: Paper chromatography, column chromatography, Thin layer chromatography, adsorption chromatography, partition chromatography, Gas chromatography, Gas-liquid chromatography, Ion exchange chromatography, Exclusion (permeation) chromatography, affinity chromatography, HPLC, HPTLC, Capillary Chromatography and Electrophoresis.

Unit V

Basic Organic Chemistry: Important preparations and properties of alkanes, alkenes, alkynes, aromatic hydrocarbons, alcohols, phenols, carboxylic acids, aldehydes, ketones, amines and nitro compounds.

Unit VI

Proteins: Classification, Structure and Properties, Molecular weight determination, Isoelectric point, coagulation and denaturation. Carbohydrates: Classification, Structure and Reactions. Fats and Lipids: Classification, Structure and Reactions. Alkaloids: Classification, Isolation and Identification.

Unit VII

Extraction, isolation & identification of Alkaloids viz- Morphine, Codeine, Brucine, Strychnine, Nicotine, Atropine, Hyoscyamine, Cocaine, Heroin and Datura alkaloids. Extraction, isolation & identification of sedative, depressants, stimulants, opiates and drugs of abuse.

Unit VIII

Medicinal Chemistry: General drugs, Designer Drugs, Drugs of abuse, mode of administration and pharmacological action of drugs of forensic importance. Drugs Act, Excise Act and NDPS Act.

Unit IX

Narcotics drugs and psychotropic substances: Definition, types, appearance, production and chemical characteristics. Common terminology of various drugs. Drug action on central nervous system. Sampling and analytical techniques for qualitative & quantitative analysis.

Unit X

Plants of Narcotic importance and their morphology: Papaver somniferum, Cannabis sativa, Coca plant and analysis of their active constituents.

Psychotropic substances: Amphetamines, Benzodiazepines and their derivatives. Barbiturates, Lysergides, Mescalines and Psilocybin etc.

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Pattern of Question Papers:

1. Objective Type Paper
2. Maximum Marks : 100
3. Number of Questions : 100
4. Duration of Paper : Two Hours
5. All Questions carry equal marks
6. There will be Negative Marking

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