RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER
SYLLABUS FOR SCREENING TEST FOR THE POST OF
SENIOR SCIENTIFIC OFFICER- CHEMISTRY DIVISION
(STATE FORENSIC SCIENCE LABORATORY, RAJASTHAN, JAIPUR)

The syllabus will include the topics/units which are in the Master’s level Chemistry degree from recognized Universities by the University Grants Commission, New Delhi. As the entrant will apply for the post of S.S.O. (Chemistry), in the Forensic Science Laboratory in the State of Rajasthan, following units are also included in the syllabus of Screening test.

Unit I

Unit – II
Forensic Science: Definitions, History and Development Crime Scene Management and Investigation: Collection, Preservation, Packing and Forwarding of Physical and Trace evidences for analysis.
Legal and Court Procedure pertaining to Expert Testimony.

Unit – III
Analysis and estimation of illicit liquor including methyl, ethyl alcohol, denatured spirit, acetone, chloroform and ether in body fluids, blood and urine.
Analysis of petroleum products and petroleum residues on forensic exhibits.
Analysis of oils and fats.
Unit IV

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

Basic principles, instrumentation and applications of Ultraviolet and visible spectroscopy, Infrared spectroscopy, Atomic Absorption Spectroscopy, Mass Spectrometry, Fluorescence and Phosphorescence spectrophotometry.

Basic principles, instrumentation and applications of pH metry, Potentiometry, Conductometry.

Microscopy: Types of Microscopes, Microscope and its parts, Function, Applications in Forensic Science.

Unit V

Chromatography – Chromatographic Techniques: General Principles, paper chromatography, column chromatography, TLC, Adsorption chromatography, partition chromatography, Gas chromatography, Gas-liquid chromatography, Ion exchange chromatography, Exclusion (permeation) chromatography, affinity chromatography, HPLC, HPTLC, Capillary Chromatography.

Electrophoresis: Theory and principles.

Forensic Statistics: 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 VI

Forensic Chemistry: Definition and Scope.


Analysis of CO₂, CO and other Poisonous gases.

Analysis of some Metallic poisons – As, Sb, Pb, Ba, Cu, Hg, Zn and Thallium.

Unit VII

Determination of Adulteration in Edible oils, Food Commodities, Fertilizers, Cement and Ornaments.

Pesticide analysis in food products.

Analysis of incendiary material from debris.

Analysis of Petroleum products for adulteration.

Trap cases – Analysis of Dyes used in Trap cases.

Analysis of Detergents and Soaps.
Unit VIII

Unit IX
Alkaloids : Definition, Classification, Isolation, General Properties and Examination of Morphine, Codeine, Brucine, Strychinine, Nicotine, Atropine, Hyosyamine, Cocaine, Heroin and Barbiturate. Alkaloids from Opium, Cannabis Sativa and Datura.
Proteins – Definition, Classification, General Properties, Molecular weight determination, denaturation, Isoelectronic point, coagulation of proteins, salting and salting out of proteins and reactions. Extraction, Isolation and Identification of Psychotropic Drugs – Sedatives, stimulants, opiates and drugs of abuse.

Unit X
Steroids - Definition, Classification, Isolation and General Properties. Cholesterol, Bile acids, androsterone, testosterone, Estrone, Progesterone, Aldosterone.

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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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