SYLLABUS FOR THE POST OF SCIENTIFIC OFFICER-
QUESTIONED DOCUMENT SECTION
FORENSIC SCIENCE LABORATORY-POLICE DEPARTMENT

Syllabus:

1. The metric system: Unit of measurement - SI units. Measuring devices, Accuracy, senstivity and precision of measuring instruments. Errors in measurement, Significant figures.
2. Mechanics: Laws of motion, Linear and rotational motion, Friction, Elasticity.
3. Magnetism and Electricity : Basic properties
4. Holography: Importance of coherence, Principle of holography and characteristics, Recording and reconstruction, classification of hologram and application, non-destructive testing.Inline hologram, off axixhologram,Fourier hologram, image hologram.
5. Laser: Production, properties of laser beams such as intensity, monochromaticity, coherence, directionality and brightness. Basic laser systemsGas Lasers: (i) Molecular gas lasers- CO2 laser & N2 (ii) ionic gas laser – Ar+ laser (iii) gas dynamic laser (iv) high pressure pulsed gas laser Solid State Laser: (i) Nd:YAG laser, (ii) Nd:Glass laser, comparison of performances (iii) Tunable. solid state laser: Ti:sapphire laser; Alexandrite laser Chemical Laser: HF laser, HCl laser, COIL. Excimer laser; Color centre laser; Free electron laser; semiconductor diode laser. Laser Beam Propagation: Laser beam propagation, properties of Gaussian beam, resonator, stability, various types of resonators, resonator for high gain and high energy lasers, Gaussian beam focusing.
6. Basic concept of Spectroscopy: Atomic, molecular spectroscopy, imaging spectroscopy. Interaction of radiation with matter and its consequences. Reflection, absorption, transmission, scattering, emission, fluorescence, phosphorescence.
7. Fluorescence and phosphorescence spectrophotometry: Types of sources, structural factors, instrumentation, comparison of luminescence and UV-visible absorption methods. Infrared spectrophotometry: Dispersive and Fourier transform spectrophotometry (FTIR). Sample handling and preparation, quantitative analysis and interpretation of IR spectra, forensic applications.
8. Raman spectroscopy: Theory, instrumentation, sample handling and preparation. Correlation of IR and Raman Spectroscopy, applications.
9. Atomic Emission Spectrometry (AES): Instrumentation and techniques, arc/spark emission, ICPMS, ICP-AES,quantitative analysis, applications.
10. Advanced microscopy: The compound microscope, comparison microscope, stereomicroscope, polarizing microscope, microspectrophotometer, scanning electron microscope.
11. Detectors: photographic detectors, thermal detectors, photoelectric detectors, PMT and semiconductor detectors.
12. Statistics: Statistical evaluation of data obtained by instrumental methods. Tests of hypothesis-tests of significance of attributes, Z-test of significance and coefficient of correlation, small sample test, T-test, paired test, chi-square test, F-test for equality of variance, large sample test, normal test.

Syllabus: (Chemistry)

1. Chromatography: Introduction, principle, procedure and applications of paper chromatography, thin layer chromatography (TLC), High performance thin layer chromatography(HPTLC), adsorption chromatography, column chromatography, gas liquid chromatography, High pressure liquid chromatography (HPLC) and ultra performance liquid chromatography (UPLC)

Forensic Questioned Document section

Nature and problems of document examination, Classification of documents.Types of forgeries. Allied problems → alterations, erasers, over writings, additions and obliterations, Decipherment of secret, indented and charred documents, seal impressions and other mechanical impressions.