

Annexure - A. to notification no. 06-PSE
(DR-P) 92021 dt. 07.7.2021

**SYLLABUS FOR RECRUITMENT TO THE POST OF
SCIENTIFIC OFFICERS IN FSL, J&K.**

1. Scientific Officer, Narcotics

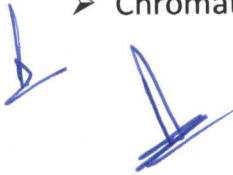
- Introduction, Definition, Principles, Scope and branches of Forensic Science, Development of Forensic Science in India
- Crime Scene investigation: Definition of Crime Scene. Classification of Crime Scene, Indoor & Outdoor, Primary & Secondary, Macroscopic & Microscopic Crime scenes, Significance and Ethics of Crime Scenes.
- Physical Evidence: Definition, Classification, Source, Significance and value of Physical evidence. Linkage between Crime Scene victim and Criminal. Study of Crime Scene relating to gas explosion, Fire and Arson, homicide, suicide, murder, mass disaster. Tools and techniques in Crime Scene search. Collection, Preservation, Packaging of the material at Crime Scene. Re-Construction of Crime Scene. Chain Custody and safety measures at the Scene of Crime and in Laboratory.
- Basic Principles of Statistics - Probability, Mean, Median, Mode, Chi square, F-Test, measurement of uncertainty, Systematic and random sampling
- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- History of Drug Abuse and related common terminologies, Roots of Administration, actions and symptoms of Narcotic Drugs and Psychotropic Substances, Different methods of extraction of Drugs, Cleanup Procedures, analysis and Field Test, Narcotics Drugs and Psychotropic substances, Introduction and Classification of Control Substances, Precursor Chemicals, Narcotic Raids and Drug Laboratories-Evidence and Forensic Examination, Mandatory Provisions of NDPS Act, NDPS Drugs, Classification of Drugs, Drug Dependence and Drug Tolerance
- Chemical Periodicity - Main Group of elements and their compounds, concept of acids and bases, Hard Soft acid base concept, Non aqueous solvents
- Chemistry of natural Products, Carbohydrates, Proteins and peptides, fatty acids, Nucleic acids, Steroids and alkaloids.
- Atomic Structure and spectroscopy – Terms, symbols, many electron systems and antisymmetric principles, basic principles of magnetic resonance. Solid State Chemistry- Solid state crystal structure, Bragg's law and its applications, band structure of solid and defects in solids.

- Solvent Extraction, pH extraction, masking agents, salting out techniques, relation between distribution ratio and distribution coefficient, advantage and application of solvent extraction, quantitative treatment of neutral chelate in extraction system, single extraction versus multiple extraction, solid phase extraction, accelerated solvent extraction, ultrasonic extraction, heat reflux extraction.
- Atomic and Molecular spectroscopy - Basic Principles, Beer Lambert's Law, Principles and Bio chemical applications of UV-VIS spectrophotometry, Atomic Absorption Spectroscopy, symbols, many electron system, basic principles of magnetic resonance, Theory and application of IR, Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, Mass Spectroscopy, advantages and applications of these techniques.
- Statistics - Types of data, basic concepts of frequency distribution, measures of central values mean, median and mode, mean and standard deviation, correlation and regression analysis, variance and discriminating powers, biostatistics : Z – test, Student “t” test, chi square test, correlation , ANOVA test.

2. Scientific Officer, Chemistry & Toxicology

- Introduction, Definition, Principles, Scope and branches of Forensic Science, Development of Forensic Science in India
- Crime Scene investigation: Definition of Crime Scene. Classification of Crime Scene, Indoor & Outdoor, Primary & Secondary , Macroscopic & Microscopic Crime scenes, Significance and Ethics of Crime Scenes.
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- Basic Principles of Statistics - Probability, Mean, Median, Mode, Chi square, F-Test, measurement of uncertainty, Systematic and random sampling.
- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Narcotics Drugs and Psychotropic substances, Introduction and Classification of Control Substances, Precursor Chemicals, Narcotic Raids and Drug Laboratories- Evidence and Forensic Examination, Mandatory Provisions of NDPS Act, NDPS Drugs, Classification of Drugs, Drug Dependence and Drug Tolerance.
- Explosive Chemistry - Introduction, Assessment, Classification and Chemistry of Explosives, Various Types of IEDs and their reconstruction, Mechanism of Explosion and their effects. Oxygen Balance, Explosive power index, heat and temperature explosion, pressure of explosion, mechanism of ignition and hotspot formation, thermal decomposition, physical and chemical aspects of combustion, Kinetics of Explosive reactions, analysis of low and high explosives by different instrumental techniques, Processing of Explosion Scene of Crimes – Role of Forensic Science, Role of Forensic Scientists in Post Blast Investigation- documentation of bomb scene and collection of post blast residues- evaluation and assessment of explosion sites and reconstruction of sequence of events, analysis of post blast residues by chemical methods, microscopic methods and various instrumental techniques.

- Forensic Drug Chemistry - Introduction to Drugs, Forensic Examination of the Drugs/ Narcotics. Sample Preparation, Extraction Techniques - Chemical colour Test, Microcrystal Techniques and other instrumental techniques
- Petroleum Chemistry- Paraffins, iso-olefins, Olefin Hydrocarbons, Naphthalenes, Cycloparaffins, Aromatic Hydrocarbons, Sulphur Compounds, Nitrogen Compounds, Oxygen Compounds, Organo-Metallic Hydrocarbons, Physical Properties of Petroleum Products - density, viscosity, surface tension, fluorescence, cloud point, smoke point, boiling point, optical properties, flash point, refractive index and calorific values, Analytical Techniques: Quantitative and Qualitative Steps in Analysis of Petroleum.
- Forensic Nuclear Chemistry – introduction to nuclear forensic, nuclear threats, nuclear explosive device, radioactivity, radioactive decay rates, methods of detection and measurement of radioactive, application of radio isotopes.
- Chemical warfare agents – Classification, physical and biochemical properties, toxic effects, detection by biosensors and various instrumental techniques.
- Fire Chemistry- Fire and Energy, Basic Chemistry, Chemistry and Behaviour of Fire, State of Matter and Behaviour of Gases, Liquids and Solids, Flammable limits.
- Basic Biochemistry- Amino acids, Lipids, Proteins, Carbohydrates.
- Forensic Toxicology Examination- Law relating to Poison, Introduction to Poisons, Forms of Poisons, Classification and methods of administration of poisons, Mode of action of Poisons, Diagnosis and management of Poisons Cases, Factors effecting the affect of Poisons and medico legal aspects in Poison cases, Collection and Preservation of Biological evidences and circumstantial evidences in fatal and survival cases, Submission of samples to the laboratory, Specific analysis plan, isolation and extraction of Poison/ Drug by various methods using instrumental techniques.
- Basic Principles of Pharmacology and Forensic Pharmacology- forensic pharmacology studies, absorption, distribution, pharmacokinetics and metabolism, pathways of drug metabolism, drug toxicity, excretion of drugs and poisons. Detection of poison on the basis of their metabolic studies.

- Chemical Periodicity, Main Group of elements and their compounds, concept of acids and bases, Hard Soft acid base concept, Non aqueous solvents
 - Solvent Extraction- Advantage and Applications- pH extraction, masking agents, salting out techniques, relation between distribution ratio and distribution coefficient, advantage and application of solvent extraction, quantitative treatment of neutral chelate in extraction system, single extraction versus multiple extraction, solid phase extraction, accelerated solvent extraction, ultrasonic extraction, heat reflux extraction.
 - Organo-metallic Chemistry
 - Qualitative and Quantative Analysis
 - Nano technology
 - Chromatography
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3. Scientific Officer, DNA

- Introduction, Definition, Principles, Scope and branches of Forensic Science, Development of Forensic Science in India
- Crime Scene investigation: Definition of Crime Scene. Classification of Crime Scene, Indoor & Outdoor, Primary & Secondary, Macroscopic & Microscopic Crime scenes, Significance and Ethics of Crime Scenes.
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- Basic Principles of Statistics - Probability, Mean, Median, Mode, Chi square, F-Test, measurement of uncertainty, Systematic and random sampling
- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Microscopy, Principles and different types of microscopes and its forensic applications.
- DNA Profiling – History of DNA, structure and functions, physiochemical properties of nucleic acid, types of DNA and their role, DNA Typing, Human Genetics, Hereditary, alleles, mutations, population Genetics, Hardy Weinberg Law, variations and polymorphism, Mitosis, Meiosis, cell biology.
- Sequencing of DNA- Maxam Gilbert method, Sanger method, Chargaff's rule, secondary structure of DNA, Watson crick model, V&Z DNA, other models of DNA structure, other secondary structural features in DNA, stem loop structure, palindromic sequences, cruciforms, DNA protein interaction; zinc finger, leucine zipper, helix-turn-helix, other motifs, DNA bending and kinks.
- Extraction of DNA from different types of biological samples, DNA extraction method, determining quality and quantity of DNA samples, Genetic Engineering.
- DNA Amplification – Principal Methodology, Types of Polymerase Chain reaction, PCR inhibitors, PCR Primers, application of PCR in cloning and forensic science.

- Types and Distribution of Body Fluids – Blood, Blood Stains, Semen, seminal stains, urine, (formation, composition, properties), amniotic fluid, sweat (formation, composition, properties), Saliva, vaginal fluid, epithelial cells their analysis and Forensic significance.
- General characteristics of skeletal muscle, nervous system in human body and human hair, animal physiology.
- Properties, classifications and functions of Carbohydrates, Proteins, Nucleic acid and Lipids.
- Electrophoresis techniques
- Intellectual property rights and its importance in DNA profiling.

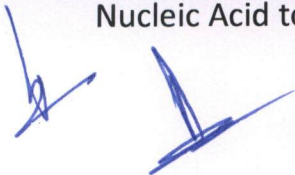


4. Scientific Officer, Biology

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- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Bio systematic and taxonomy – Chemotaxonomy, cytotaxonomy, molecular taxonomy and General classification of animals.
- Human anatomy and physiology
- Composition and Biochemical Functions of Body Fluids - Bio chemical Nature and Forensic Significance
- Evaluation of Blood and Blood Stain – Visual Examination, Ultraviolet, Infrared Examination, Microscopy, Spectroscopy, Spectrophotometry, Chromatography, Colour and Crystal Test, Luminal Test, Morphology and Composition of Hair and Fibres. Methods used in their elucidation – Applications to Forensic Science
- Semen – Identification of semen, Seminal stains and Spermatozoa – Visual Observation test, Physical Test, Ultra Violet Test, Microscopic Test, Chemical test and Enzymatic Test
- Saliva and other Body fluids – Forensic importance of Saliva and other body Fluids such as Urine, Sweat, Vomit Stains, vaginal secretion and their identification by chemical test
- Forensic anthropology – Personal identification techniques as somatoscopy and somatometry, anatomical description of Skelton of human/animal as relevant to forensic, ossification and identification of

bones for determination age, sex, race etc., Forensic anthropometry and tools involved in it, determination of personal identity, recovery and identification of Skeletal remains in accident, crime and mass disaster.

- Forensic odontology – Dentition pattern types, structure and growth of teeth, eruption sequence, age determination, identity of person, role in mass disaster. White mark analysis of human/ animal.
- Forensic botany and wood anatomy, Forensic medicine, forensic entomology and wild life forensic.
- Forensic Microbiology- Isolation classification and identification of microbial organisms, cell structure of bacteria and fungi. microorganisms encountered in biological warfare and its forensic applications,
- Planktonics study- Various of phytoplankton's, diatoms and their forensic importance, importance of diatom test in drowning cases, precautions in collection, preservation and forwarding of biological samples for diatom test.
- Forensic Genetics- elements of human genetics, introduction, principles of hereditary, gene structure, gene mapping and gene expressions. Genetics markers and their forensic significance, mutations, structure of DNA, human genome, DNA methodology for isolation, typing interpretation of results, Characterisation, Properties and Structure of Nucleic Acid to Forensic DNA Application.



5. Scientific Officer, Serology

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- Basic Principles of Statistics - Probability, Mean, Median, Mode, Chi square, F-Test, measurement of uncertainty, Systematic and random sampling
- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Cellular organisation- Structural Organisation and function of the cell including plasma membrane, intracellular organelles and chromosomes, cell division and cell cycle
- DNA replication and protein synthesis- Structures and types of DNA, replication mechanism, enzymes involved in replication, biosynthesis of proteins.
- Acid Base balance and enzymes – Molecules and their interaction
- Human physiology and pathology- Forensic pathology
- Human Genetics- Genes, genetic codes, gene expression, regulation of gene expression, alleles, karyotypes, genetic disorders, mutation types and their causes, Genetic markers and their Forensic significance, mutation, classification, cause, mechanism, role of genetic analysis and evolution, Mendel's law of inheritance, extension of Mendelian principles- co dominance, incomplete dominance, linkage and crossing over techniques,
- Forensic Immunology and DNA examination- Forensic Immunology – innate and adaptive immunity, B cell/ T cell, structural development, diversity and reorganisation, antigen, antibody, blood groups, application of ABO blood group in disputed paternity cases, polymorphic

enzymes and polymorphic proteins in reference to forensic serology, HLA antigen, secretors and non secretors, blood grouping in biology fluids other than blood, DNA Profiling- uses of DNA polymorphism in forensic cases, DNA typing and individualisation sources of DNA in forensic cases, isolation of DNA(organic extraction, PCR, SNP, STRs, Mitochondrial DNA polymorphism

- Forensic Serology – Types and properties of antigens and antibodies. Principles, determination of species origin of blood and blood stains, blood grouping Techniques in fresh and dried blood stains, Blood grouping Types and their importance in Forensic analysis. Estimation of age of Blood Stains.
- Serological Techniques- Electrophoresis methods, presumptive and confirmatory test for blood, identification of blood property, blood grouping, Spectrophotometry, microscopy.
- Immuno Acid Methods – Immuno precipitation, Immuno Diffusion, Immuno Electrophoresis, ELISA
- Body Fluids and their Stains – Introduction to various kinds of body fluids, composition, physical pattern and identification of seminal stain- presumptive test and confirmatory test, morphological structure of spermatozoa of human and animals, identification of lochial and menstrual blood stain by microscopic biochemical and immune-electrophoretic method. Identification and examination of other body fluids/Stains- Vaginal, saliva, urine, faeces, vomit etc.

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- Basic Principles of Statistic - Probability, Mean, Median, Mode, Chi square, F-Test, measurement of uncertainty, Systematic and random sampling
- Expert testimony in court of Law- Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Conservation Laws, collisions, impact parameters, centre of mass and lab systems with transformation of physical quantity, rotating frame of reference, coriolis force, motion of rigid bodies, moment of inertia, angular momentum, torque and precession of torque, central forces, motion under inverse square law, special theory of relativity, Michelson-Morley experiment, Lorentz transformation- addition of velocities, time dilation and length contraction, variation of mass with velocity, mass energy equivalence
- Oscillations, simple harmonic motion, damped Harmonic motion, force oscillations and resonance, Wave equation, harmonic solutions, plane and spherical waves, superposition of waves, beats, stationary waves, phase and group velocities. Conditions of interference, Newton's rings and Michelson's interferometer, diffraction, plane circular and elliptically polarised light, its production and detection.
- Kinetic theory of gases, Maxwell, Boltzmann, Bose Einstein and Fermi Dirac distribution. Maxwell's distribution of velocities, equipartition of energy, specific heats of gaseous, mean free path Brownian motion, black body radiations, Wien's Law, Planck's Law, solar constant, specific heat of solid= Einstein and Debye's theory

7. Scientific Officer, Ballistics

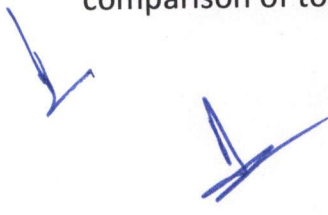
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- Oscillations, simple harmonic motion, damped Harmonic motion, force oscillations and resonance, Wave equation, harmonic solutions, plane and spherical waves, superposition of waves, beats, stationary waves, phase and group velocities. Conditions of interference, Newton's rings and Michelson's interferometer, diffraction, plane circular and elliptically polarised light, its production and detection.
- Kinetic theory of gases, Maxwell, Boltzmann, Bose Einstein and Fermi Dirac distribution. Maxwell's distribution of velocities, equipartition of energy, specific heats of gaseous, mean free path Brownian motion, black body radiations, Wien's Law, Planck's Law, solar constant, specific heat of solid, Einstein and Debye's theory

- Electric Field and Potential – Gauss's Law, Poisson's Law and Laplace equations, Dielectrics and polarisation, electromagnetic induction, transformer, transient behaviour of R-C and R-L circuit, time constant response of L-C-R circuits for alternating voltages, series and parallel resonance, bandwidth, and Q factor, magnetic properties of material, vector and scalar potential: electromagnetic field tensor, covariance of Maxwell's equation, total internal reflection, normal and anomalous dispersion
- DeBorglie waves, photoelectric effects, Compton effect, wave particle duality, uncertainty principle: Size of H atom, zero point energy, Finite width of energy level, Schrodinger wave equation with application, hydrogen spectral, electrons spin, stern- Gerlach experiments, space-quantisation, vector model of atom, Zeeman's effect, characteristics and quantinuos x-rays
- Scanning and transmission, electron microscopies: band theory of solid, thermal property of solid, specific heat, elements of super conductivity, Kirchhoff's Law
- Metrics System – Units of measurement- SI unit, measuring devices, accuracy, sensitivity and precision of measuring instruments, errors in measurement, significant figures
- Laser – Production, Properties of Laser Beam such as intensity, Monochromatocity, coherence, directionality and Brightness. Basic Laser System. Gas Laser, Solid State Laser, Excimer Laser, Laser Beam Propagation.
- Probability- Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions, mathematical expectation, moments, moment generating function, characteristic function, Discrete distributions: binomial distribution, Poisson distribution, continuous distributions: normal distribution, exponential distribution, Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, conditional expectations, independent random variables, Bivariate normal distribution, correlation coefficient, joint moment generating function and calculation of covariance, linear regression for two variables, Chebyshev's inequality, statement and interpretation of (weak) law of large numbers and strong, law of large

- Electric Field and Potential – Gauss's Law, Poisson's Law and Laplace equations, Dielectrics and polarisation, electromagnetic induction, transformer, transient behaviour of R-C and R-L circuit, time constant response of L-C-R circuits for alternating voltages , series and parallel resonance, bandwidth, and Q factor, magnetic properties of material, vector and scalar potential: electromagnetic field tensor, covariance of Maxwell's equation, total internal reflection, normal and anomalous dispersion.
- DeBorglie waves, photoelectric effects, Compton effect, wave particle duality, uncertainty principle: Size of H atom, zero point energy, Finite width of energy level, Schrodinger wave equation with application, hydrogen spectral, electrons spin, stern- Gerlach experiments, space-quantisation, vector model of atom, Zeeman's effect, characteristics and quantinuos x-rays
- Scanning and transmission, electron microscopies: band theory of solid, thermal property of solid, specific heat, elements of super conductivity, Kirchhoff's Law
- Metrics System – Units of measurement- SI unit, measuring devices, accuracy, sensitivity and precision of measuring instruments, errors in measurement, significant figures
- Laser – Production, Properties of Laser Beam such as intensity, Monochromatocity, coherence, directionality and Brightness. Basic Laser System. Gas Laser, Solid State Laser, Excimer Laser, Laser Beam Propagation.
- Spectroscopic methods in structural determination of organic compounds- Different units of wavelength frequency, different regions of electromagnetic radiations, interaction of radiations with matter, excitation of molecules with different energy levels, types of spectroscopy and advantages
- Basic concept of Statistics and elementary knowledge of computers.
- Forensic Physics - Soil – Formation and types of Soil, Composition and colour of soil, particle size distribution and turbidity test, microscopic examination, density gradient analysis, ignition loss, differential thermal analysis, elemental analysis.
- Paint – Types of Paint and their composition, macroscopic and microscopic studies, pigment distribution and colorimetry, micro-chemical analysis – solubility test, TLC, Pyrolysis chromatographic

techniques, IR absorption spectroscopy of paint samples & X ray diffraction, elemental analysis.

- Fibre – Classification of textile fibres – production, structure and properties, the structure of textiles – an introduction to the basics, ropes and cordage, visible & infrared microscopical examination of fibres, instrumental methods used in Fibre and dye examination.
- Impressions: Foot /Footwear/Type Impression, Collection, Tracing, Lifting, Casting of impressions, Gait Pattern and Identification characteristics, Superimposition of impression on footwear and foot imprints.
- Tool Marks: Types of tool marks: Compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics, tracing and lifting of marks, photographic examination of tool marks and cut marks on clothes, comparison of tool marks by comparison microscope.



numbers, Central Limit theorem for independent and identically distributed random, variables with finite variance, Markov Chains, Chapman-Kolmogorov equations, classification, of states.

- Trigonometry- Angles, Angle Relationships and Similar Triangles, Trigonometric Functions, Using the Definitions of the trigonometric Functions, Trigonometric Functions of Non-Acute Angles, Approximations of Trigonometric Function Values, Linear and Angular Speed, Fundamental Identities, Verifying Trigonometric Identities, Trigonometric ratios of an acute angle of a right-angled triangle, Values of the trigonometric ratios, Relationships between the ratios, Trigonometric identities, Heights and Distances: Angle of elevation, Angle of Depression, Simple problems on heights and distances, Problems involve more than two right triangles, Angles of elevation / depression.
- Kinematics- Displacement, velocity and acceleration of a particle moving in a straight line: Including the derivation and use of the formulae for constant acceleration, and the use of displacement-time and velocity-time graphs, Non-uniform acceleration problems involving the setting up and solution of first-order differential equations of the separable type, Appreciation of the identity $dv/dt = v \, dv/dx$, Angular speed, constant angular acceleration, Motion in a horizontal circle with uniform speed including the conical pendulum and banked tracks, Problems on projectiles: equation of the path of a projectile, its horizontal range, its associated time of flight, and the maximum height.
- Fire Arms and tool marks – Types of Fire Arms, Fire arms Barrel, Anatomy of ammunition, Collection of Fire arms evidence, safety and operation testing, fire arm database, automated search system, distance of firing, Gun powder residues, short pattern, toolmarks- various types and comparison.
- History and development of fire arms – Their classification and characteristics, various characteristics of small arms, bore and caliber, Different mechanism used in small arms, cartridge firing mechanism, projectile velocity determination, determination of velocity of short charge, techniques of dismantling and assembling of various types of fire arms, identification of origin: various marks on fire arms and their constructional features
- Types of ammunition , classification and constructional features of different types of cartridges, types of Primers and priming composition

➤ Propellants and their composition

Use of brass/ copper for manufacture of cartridge cases, different shapes of cartridge cases, various types of bullets and compositional aspects.



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- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Metrics System – Units of measurement- SI unit, measuring devices, accuracy, sensitivity and precision of measuring instruments, errors in measurement, significant figures
- Mechanics – Laws of motion, Linear and rotation Motion, Friction, elasticity.
- Magnetism and Electricity-Basic properties.
- Holography – Importance of Coherence, Principles of Holography and Characteristics, recording and re-construction, Classification of Hologram and application.
- Laser – Production, Properties of Laser Beam such as intensity, Monochromaticity, coherence, directionality and Brightness. Basic Laser System. Gas Laser, Solid State Laser, Excimer Laser, Laser Beam Propagation: Properties of Gaussian Beam, resonator stability, various types of resonators, resonators for high gain and high energy lasers, Gaussian beam focusing.
- Basic Concept of Spectroscopy- Atomic, molecular spectroscopy, imaging spectroscopy, interaction of radiation with matter and its consequences, reflection, absorption, transmission, scattering, emission, fluorescence, phosphorescence.

- Fluorescence and Phosphorescence Spectrophotometry- Types of sources, structural factors, instrumentation, comparison of luminescence and UV visible absorption method, infrared , spectrophotometry: dispersive and Fourier transform spectrophotometry, sample handling and preparation, quantitative analysis and interpretation of IR spectra forensic application.
- Raman Spectroscopy : Theory, instrumentation, sample handling, and preparation. Correlation of IR and Raman spectroscopy, applications
- Atomic Emission Spectrometry: Instrumentation and techniques, arc/spark emission, ICPMS, ICP-AES, quantitative analysis.
- Advance Microscopy: Compound microscope, comparison microscope, stereomicroscope, polarising microscope, micro spectrophotometer, scanning electron microscope.
- Detectors: Photographic detectors, thermal detectors, photoelectric detectors, PMP and semi conductor detectors.
- Statistics : Statistical evaluation of data obtained by instrumental methods, test of hypothesis- test of significance of attributes, Z-test of significance and coefficient of correlation, small sample test, paired test, chi-square, test, F-test for equality of variance, large sample test, normal test.
- 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).
- Nature and problems of document examination, Classification of documents. Types of forgeries. Allied problems – alterations, over writings, additions and obliterations, Decipherment of secret, indented and charred documents, seal impressions and other mechanical impressions.
- Analytical techniques: Microscopy, spectroscopic techniques.

9. Scientific Officer, Cyber Forensic

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- Basic Principles of Statistics- Probability, Mean, Median, Mode, Chi square , F-Test, measurement of uncertainty, Systematic and random sampling
- Expert testimony in court of Law - Admissibility of evidence, Laws and acts relevant to Forensic Science.
- Digital Forensic and Cyber Crime: Understanding cyber crime, Indian IT act 2008 and amendments, categories of cyber crimes, email related crimes, internet relay, chat relating crimes, online gambling, phishing, intellectual property crimes, web defacement, DOS attack.
- Working with windows and DOS System: understanding file system, exploring Microsoft file structure, examining and TFS disks , understanding whole disk , encryption, understanding the windows registry, understanding Microsoft startup task, understanding MS-DOS start up tasks, understanding virtual machines, Macintosh and Linux boot processes and file systems, understanding other disk structure, free space management, bit vector linked list grouping, counting efficiency and performance recovery, physical damage, physical damage recovery, logical damage, logical damage recovery.
- Current computer Forensic Tools: Tools needs computer forensic software tools, computer hardware tools, validated and testing forensic software, Data acquisition: understanding storage formats for digital evidence, determining the best acquisition method validating data acquisition, validating forensic data, addressing heading techniques, using remote network acquisition tools, recovering graphic files.

- Networking: LAN, MAN, WAN, Internet, Network Addressing techniques, TCP/IP protocol, FTP, HTTP, IMAP, SMTP, Telnet, SNMP, RPC, IPv6, ICMP, SLIP, Network devices- Repeater, Hub, Switch, Router, Bridge and Gateway.
- Mobile Computing: Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio
- GSM-Channel allocation, call routing Architecture, PLMN interface, addresses and identifiers, network aspects, frequency allocation, authentication and security, Handoffs Technique. WAP applications, WAP Architecture, WAP Protocol Stack, introduction and features of 4G network, 4G network architecture.
- Network Security: Cryptography, Secret Key and Public Key Cryptosystems, Symmetric Ciphers, Block Ciphers and Stream Ciphers, DES, Triple DES, RSA. Network Security Applications, Authentications, Authentication Mechanisms: a) Passwords, b) Cryptographic authentication protocol, c) Smart Card, d) Biometrics, e) Digital signatures and seals, E-mail Security, PGP's/ MIME, IP security, Access and System Security, Intruders, Intrusion Detection and Prevention, Firewall a) Hardware Firewall b) Software Firewall c) Application Firewall d) Packet Filtering e) Packet Analysis, Proxy Servers, Firewall setting in Proxy, ACL in Proxy.
- Programming in C/C++
- Computer Hardware/Software
- Number System and Codes
- Next generation internet Protocol
- PCP/IP
- Non linear data structure and hash tables
- Initial response and forensic Duplication.
- Network Forensics
- RFID Security
- Implementation of cover channel
- Ethical Hacking Terminology
- Foot printing and social engineering.
- Public key cryptography.

Besides the candidates should possess the following ^(Posts) [Common for all Divisions]

Verbal Ability:

- The candidates are expected to have good command over English language and its usage. It will be tested with focus on Articles, Verbs, Tenses, Prepositions, Synonyms, Antonyms, Punctuation, Reading comprehension, Cloze passage, Grammar, Idioms and phrases

Analytical Ability:

- The candidates will be tested primarily on the various cognitive abilities using qualitative reasoning. The broad areas will include Letter Series, Number Series, Relationship Concepts, Direction Sense, Concept of Speed-Time-Distance, Coding-Decoding, Analogy etc.

General Awareness and Current Affairs:

- The objective of this section is to assess candidates' general knowledge about J&K, India and the World.

ANNEXURE "B"

**FORMAT FOR WORKING EXPERIENCE CERTIFICATE FOR THE POSTS OF
SCIENTIFIC OFFICER IN DIFFERENT DISCIPLINES IN FORENSIC SCIENCE
LABORATORY (HOME DEPARTMENT)**

Certified that Mr/Ms _____ has acquired working experience as _____ (here mention the nomenclature of the post) in the discipline/field of _____, Department of _____ (here mention "title of the Laboratory with name of the institution"), from _____ to _____.

It is further certified that the Laboratory is a Government Lab
(Govt. of _____) or is a Lab of Government undertaking, Govt.
of _____.

Signature of the Head of the Institution

Dated:- _____