The Screening Test (CBT/ Offline) will be of 100 marks of two hour duration.

Assistant Director (Documents & Photography) and Scientific Officer (Documents & Photography)

Sr. No.	Subject	No. of questions
1	Introduction to Forensic Science: Definition and Scope of Forensic Science, History and Development of Forensic Science, Need and Principle, Police and Forensic Science laboratories / institutions in India and responsibility of Forensic Scientist. Crime Scene management techniques types of Crime Scene, Crime Scene ethics, role of the first arriving Officer, Crime Scene documentation, searching, collection, packaging and forwarding of physical evidences, Maintaining the chain of custody, Reconstruction of scene of crime. Expert testimony in Court of Law: admissibility of forensic evidence, laws and acts relevant to Forensic Science. **The metric System**: Unit of measurement-SI units, Measuring devices, Accuracy, sensitivity and precision of measuring instruments, Errors in measurement, Significant figures. **Mechanics**: Laws of motion, Linear and Rotational motion, Friction, Elasticity, Magnetism and Electricity and its basis properties, Holography: Importance of coherence. Principle of holography and characteristics, recording and reconstruction, classification of hologram and application, non-destructive testing. **Laser:** Production, properties of laser beams such as intensity, monochromaticity coherence directionality and brightness, Basic laser systems Gas Laser: (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 performance (iii) Tunable, solid state laser: Ti:sapphire laser; Alexandrite laser Chemical laser: HF laser, HCI 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. **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 Lumniscence and UV-visible absorption methods. Infraed spectrophotometry: Dispersive and Fourier transform spectophotometry (FTIR). Sample handling and preparation, quantitative analysis and interpretation of IR spectra, forensic applications. **Raman spectroscopy:** Theory, instrumentation, sample handling and preparation, correlation of IR and Raman Spectroscopy, applications. Atomic Emission Spectrometry (AES): Instrumentation and techniques, are/spark emission, ICPMS,ICP-AES, quantitative analysis, applications. **Advanced Microscopy:** The compound microscope, comparison microscope, stereomicroscope, polarizing microscope, micro-spectrophotometer, scanning electron microscope, Detectors: Photographic detectors, thermal detectors, photoelectric detectors, PMT and semiconductor detectors. **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. **Statistics:** Statistical evaluation of data obtained by instrumental method.	**70 questions of 70 marks**

	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. **Forensic Document Examination:** Legal aspects of Forensic Document examination, 293CrPC, Section 45 evidence act, definition of expert, Indian Penal Code Under Sections viz. 420, 463, 464, 467, 468, 471, 120B, 302, 306, 489A and Copy Right Act. Classification of Documents, Care, handling, preservation of documents; Preliminary examination of Case Documents; Principle of handwriting examination; Importance of natural variations. Holographic documents; Comparison of handwriting, principle of fundamental divergence, natural variations in handwriting, nature and types of Forgeries, characteristics of genuine and forged signatures, their detection, artificial and natural tremor, basis tools needed for forensic documents examination and their significance. **Alterations in Documents:** Addition, deletion, obliterations, substitutions, overwriting, built up documents, determination of sequence of intersecting strokes, Ink examination, chemical composition of different types of inks, destructive and non-destructive techniques involved in differentiation of ink. Writing instruments, working of foundation pen, ball pen, get pen, writing inks. Printing inks and printing toners. Viscosity, Surface tension, Capillary rise. **Paper examination:** Physical comparison, chemical composition, sizing & loading materials, tensile strength comparison techniques: destructive & non-destructive, Examination of printed labels, Wrappers, rubber seal impressions, Facsimile document, Photocopy and scanned documents: process of scanning. Indented writings, Charred documents: preservations and examination techniques involved. **Printed Document examination:** Printing technology, examination of type-script, classification of printers: identification of printed matter, different printing technologies, Examination of computer printouts. Concept of e-documents and digital signature. **Examination of Security Documents**: Currency notes, Passport, Visa, Various Identity Cards, Stamp Papers, Travel documents. OVI ink, thermal ink, Examination of Credit, Debit and other plastic cards. **Forensic Photography** Basics of Light sources, Mirrors, lens, Focal length, Image formation, Newton's laws on motion, Callers' law, Bernuil principals, Doppler's Principals and effects. Photographic Optic and Equipments: History of B/W Photography: Early experiments and later developments. Photographic, Chromatic and spherical aberration, curvature of field, distortion and astigmatism, methods of reducing the above defects. Aperture of diaphragm, its function, notation , different kinds of aperture and their construction, dependence of depth of field and focus on distance and number. Types of camera lenses: Single (meniscus), achromatic, symmetrical and unsymmetrical lenses, telephoto, zoom , macro, supplementary and fish-eye lenses. Concept of Digital imaging, Concept of the megapixels, optical and digital zoom, image size, file size, concept of frame, perception and composition. Photographic camera types: Pin-hole, box, folding, large and medium format cameras, single lens reflex(SLR) and twin lens reflex (TLR), miniature, subminiature and instant camera, choice of camera and sizes, rising, falling, cross movements and swing back devices. Principal parts of Photographic cameras: (a) Lens (b) Aperture (C) Shutters, various types and their functions, focal plane shutter and in-between the lens shutter, shutter synchronization, self-timer. View-finders and focusing systems: Direct vision and ground glass view finders, frame view finder, plane mirror and penta-prism view- finder, Fresnel prism focusing, split image focusing, range finders and range finder focusing, mechanism focusing distance scale. Film chamber: Exposure counter, self	

	–timer, tripod stand, panning tilt head, lends hood, cable release. Photographic Light Sources: (a) Natural source, the Sun, nature and intensity of the sunlight at different times of the day, different weather conditions. (b) Artificial light sources: nature, intensity of different types of light sources used in photography namely. Printing: Contact printing, projection printing using an enlarger, enlargement on Bromide paper, selection of papers, technique of enlargement- Burning, dodging, vignetting, flashing, diffusion or soft focus, distortion creation and correction, making cartoon and multiple photograph on the same paper, making giant enlargements, glazing and drying. Trick Photography: Methods, effect box, photomontage, wire screen-star effect, use of diffraction grating, texture effect, photolith, Bas-relief, solarization and photo grams. Photomicrography: Photography using a microscope, essential equipments and methods, use of polarized light. Colour Photography: Basic principle, idea of colour, primary and secondary colours, colour and colour temperature.	
2	**General Knowledge (National & International level)**	**10 questions of 10 marks**
3	**General Knowledge of H.P.**	**20 question of 20 marks**