

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

**UNIT -I**

Basics of Light, Mirrors, lens, Focal length, Image formation, Newton's laws on motion, Capillary law, Bernoulli's principle, Doppler's Principle and effects, Black body radiations.

pHmetry, Hydrogen Ion concentration, Ionic Movements, Acid, Alkali, Salt. Le Chatelier's Law, calorimetry, Periodic Table and properties of elements of different *S, P, D* Blocks Radioactivity and half life numerical. Colloidal State, Solutions, colligative properties. Law of crystallography, Phase rule,

Basic Classification of Animal Kingdom, Basic knowledge of Human body parts, Cell division. DNA and RNA structures, Type of DNA and RNA, Human Skeletal System, Respiratory System, Human Circulatory System. Human Respiratory and Reproductive System, Basic Classification of Plant Kingdom, families, Reproductive System in plants, Types of roots, types of Stems,

Derivative of the length of an arc, curvature various formulae, center of curvature, chord of curvature and related problems, asymptotes, partial differentiation, homogeneous form, Maxima minima of functions of two variables. Beta and Gamma function, differential equation of first order and first degree linear differential equations of second order, ordinary simultaneous differential equation, General properties of equations, character and position of the roots, Relations between roots and coefficients, Symmetric functions of roots, Group, Sub groups and their properties, normal subgroups, Rings, Examples of rings, Ring with Unity, Integral domains and fields their examples and properties. Vectors spaces, sub spaces, linear spans, Linear dependences, independence and their properties, basis, finite dimensional vector space. Tracing of conics, center of a conics, ordinates of the

center, equations of conic referred to center as origin, asymptotes of a conics, length and position of axes of a standard conics, eccentricity, foci, directrices, axis, latus rectum of a conic, vertex and focus of a parabola, tracing of ellipse and hyperbola.

## **UNIT-II**

Introduction to Photography. Meaning and definition of photography. Basic principle in conventional and digital photography, History of photography. Basic camera, Different parts of a camera and their basic function, camera accessories.

Types of camera Classification of cameras on the basis of film size, focusing arrangements, viewfinder systems and general usage. 35mm compact, 35mm SLR, Digital SLR, 120 film type TLR and SLR, instant (Polaroid) cameras, large format cameras and various digital cameras.

Main controls on a camera, Lens: Construction of a lens, compound lens and lens elements. Lens coatings. Characteristics of lens such as focal length, speed of lens, angle of view, wide-angle lens, normal lens, telephoto lens and zoom lens etc.

Shutter: Construction and types of shutter. Shutter timings and shutter speeds. Use of specific shutter speed depending upon lighting conditions, type of photography etc.

Diaphragm: Construction of a diaphragm. Aperture and their corresponding frame-numbers. Exposure, Meaning and definition of Exposure. F-number and shutter speed relationship, equivalent exposure settings. Film & Digital Image sensor Introduction to a photographic film, Meaning of emulsion. Types of film, characteristics of film such as film speed, graininess, gradation and contrast, exposure latitude. Construction of digital image sensor, Pixel, Resolution and Sharpness, ISO settings etc. Depth of field, Lighting, Photography with flash, Automation in camera, Close-up photography, Filters in photography, Introduction to colours, Introduction to Digital Photo Imaging, Introduction to Digital Photo Editing, Close up and Macro Photography, Understand different file formats RAW, TIFF, JPEG, printing resolution, Forensic Photography, Biological evidence, Chemical evidence, Patterned evidence Trace evidence Determination of corpus delicti, Modus operandi identification. Association or linkage, the Locard Exchange Principle, transfer of evidence by contact. Disproving/supporting

victim/suspect/witness statements, Identification of suspects/victims/crime scene location.

History of Digital photography, Matrix performance; resolution, distortion, dispersion, CMOS, CCD, negative film, reversal film etc, Capture format: pixel count, digital file type (RAW, TIFF, JPEG), film format (135 film, 120 film, 5x4, 10x8). Processing: digital and/or chemical processing of 'negative' and 'print'. Pixel counts, Dynamic range, Storage, Advantage and disadvantage of Digital Camera, Features Image noise / grain, Speed of use, Frame rate, Image longevity, Colour reproduction, Frame aspect ratios.

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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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