प्राबिधिक प्रहरी निरीक्षक (विधिविधान समूह, Physics उप-समूह) को खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम।

पाठ्यक्रमको रूपरेखा:— यस पाठ्यक्रमको आधारमा निम्नलिखित दुई चरणमा परीक्षा लिइने छ।

| प्रथम चरण:— | लिखित परीक्षा (Written Examination) | पूर्णाङ्क: ९५।
| द्वितीय चरण:— | अन्तर्वाता (Interview) | पूर्णाङ्क: २५।

प्रथम चरण:— लिखित परीक्षा योजना (Examination Scheme)

<table>
<thead>
<tr>
<th>पत्र</th>
<th>विषय</th>
<th>पूर्णाङ्क</th>
<th>उत्तराङ्क</th>
<th>परीक्षा प्रणाली</th>
<th>प्रश्न संख्या x अंकहार</th>
<th>समय</th>
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<tbody>
<tr>
<td>प्रथम</td>
<td>Physics &amp; Forensic Science</td>
<td>१००</td>
<td>४०</td>
<td>विषयवात</td>
<td>३०</td>
<td>३ घण्टा</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>१४x५ = ७०</td>
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<tr>
<td>द्वितीय</td>
<td>नेपाल प्रहरी सेवा सम्बन्धी</td>
<td>५०</td>
<td>२०</td>
<td>बस्तुगत बहुउत्तर</td>
<td>१०x१ = १०</td>
<td>१ घण्टा</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>२०x१ = २०</td>
<td>१० मिनेट</td>
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</table>

<table>
<thead>
<tr>
<th>परीक्षाको किसिम</th>
<th>पूर्णाङ्क</th>
<th>परीक्षा प्रणाली</th>
</tr>
</thead>
<tbody>
<tr>
<td>व्यक्तिगत अन्तर्वाता</td>
<td>२५</td>
<td>मौखिक</td>
</tr>
</tbody>
</table>

१. लिखित परीक्षाको माध्यम भाषा नेपाली बा अंग्रेजी अवश्य नेपाली र अंग्रेजी दुवै हुन सक्ने।
२. प्रथम र द्वितीय पत्रको लिखित परीक्षा छटाए हुन्छ।
३. प्रथम पत्रमा पाठ्यक्रमका एकाइहरुबाट सोधिने प्रश्नहरुको संख्या निम्नलिखित हुनेछ भने द्वितीय पत्रमा सोधिने प्रश्न संख्या र अंकहार द्वितीय पत्रको पाठ्यक्रममा उल्लेख गरिएको छ।
पाठ्यक्रम को एकाई | Physics | Forensic Science
--- | --- | ---
पाठ्यक्रम को लामा प्रश्न | 2 बटा | 1 बटा
छोटी प्रश्न | 1 बटा | 5 बटा

4. वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरूको उत्तर सही दिएमा प्रत्येक सही उत्तर भएपाइँदै प्रदान गरिनेछ, भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर भएपाइँदै २० प्रतिशत अझ कडा गरिनेछ। तर उत्तर नदिएमा त्यस भएपाइँ अझ दिइन्छ र अझ कडा पनि गरिनेछ।

5. यस्तो चरणको लिखित परीक्षाकार छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्भाबामा सम्मिलित गराइनेछ।

6. अन्तर्भाबातको अंकभार सम्बन्धमा प्रहरी सेवाको पदमा नियुक्ति र बढूबा गद्दी अपनाउनु पनि सामान्य सिद्धान्त, २०६९ को अनुसूची-१९ मा व्यवस्था भए बमोजिम हुनेछ।

7. पाठ्यक्रम लामो मिलि : [ ]
<table>
<thead>
<tr>
<th>Subject</th>
<th>Unit</th>
<th>No. of Questions and Weightage</th>
<th>Full Marks</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Long Answer Type Question (3)</td>
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<tr>
<td></td>
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<td>Short Answer Type Questions (14)</td>
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<tr>
<td></td>
<td></td>
<td>Marks</td>
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<tr>
<td><strong>PHYSICS</strong></td>
<td>1. Mechanics</td>
<td>2 x 10 marks = 20 marks</td>
<td>65</td>
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<tr>
<td></td>
<td>2. Optics</td>
<td>9 x 5 marks = 45 marks</td>
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<tr>
<td></td>
<td>3. Atomic and Nuclear Physics</td>
<td>35</td>
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<td></td>
<td>4. Electricity and Magnetism</td>
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</tr>
<tr>
<td></td>
<td><strong>FORENSIC SCIENCE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Introduction to Forensic Science</td>
<td>1 x 10 marks = 10 marks</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>6. Crime Scene Investigation</td>
<td>5 x 5 marks = 25 marks</td>
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<td></td>
<td>7. Introduction to Questioned Document Examination</td>
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<td></td>
<td>8. Introduction to Physical Examination</td>
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</tr>
</tbody>
</table>
Group-A
PHYSICS (65%)

Unit 1: Mechanics

**Probability and Statistical Analysis of Data:** Concept of Probability, Distribution function (Minomial, Normal and Poisson) Systematic and random errors, Standard errors, least square fit, Chi-square, F and T test, interpolation, numerical value.

**Fluid Mechanics:** Kinematics of moving fluid, equation of continuity, Euler’s equation, Bernoulli’s theorem. Viscous fluids, stream line and turbulent flow, poiseulle’s law and its application, Reynold’s number

**Relativity:** Gallilean invariance, inertial frames of reference, Gallilean transformation, non-inertial frames and fictious forces Michelson- Morley experiment, Lorentz transformation. Length contraction, time dilation, transformation and addition of velocities, variation of mass with velocity, mass energy relation, relation between momentum and energy, transformation of energy and momentum.

Unit 2: Optics:

**Diffraction:** Huygen’s principle, Fresnel and Fraunhoffer diffraction. Fresnel’s diffraction: Zone plate, Circular aperture, Straight edge, Straight wire, disc. Fraunhoffeer’s diffraction: Diffraction through a single and double slit, Circular aperture and disc. Dispersive power of grating, microscope and telescope.

**Polarization:** Unpolarized, plane, circular and elliptically polarized light, Double refraction, Crystal polarizer, Malus law, Brewster’s polarization by reflection and scattering, double refraction and Huygen’s explanation, Production and analysis of polarized light, activity Laurent’s half shade polarimeter and its application.

**Dispersion and Scattering:** Normal and anomalous dispersion, scattering of light.

**Lasers:** Spontaneous and induced emission, condition for laser action, population inversion, optical punping, Ruby and He-Ne lasers and application.

Unit 3: Atomic and Nuclear Physics:

**Bohr’s Atomic Theory:** Bohr’s hydrogen atom, energy level diagram and spectra of hydrogen atom, Frank-Hertz experiment and limitation of Bohr’s model.
**Fine Structure Spectrum:** Fine structure of Hydrogen lines, doublet structure of alkali spectrum, single and triple series of alkaline earth atoms

**Characteristic X-ray Spectrum:** Characteristic X-ray, X-ray Spectrometer, Fine structure of X-ray transitions, Mosley law and its application

**Radioactivity:** Basic of the theory of radioactive disintegration, half-time, mean life, successive radioactive transformations, equilibrium, natural radioactive series, units of radioactivity, Qualitative discussion of alpha, beta and gamma ray spectra, absorption of alpha- particles, range, straggling and stopping power, theory of alpha-decay, Neutrino hypothesis of beta-decay, qualitative discussion of the theory of beta-decay

**Unit 4: Electricity and Magnetism**

**Electrostatic Potential and Field:** Coulomb’s law, the electric field, electric flux, Gauss’s law and its application, Equipotential surface, potential due to charge distribution, Poissons and Laplace’s equations, Work done for a moving charge, Electrostatic energy, Electrical images, Potential and field due to an electric dipole and force on a charged sphere.

**Electromagnetic Induction:** Faraday’s law, self and mutual induction, search coil, Grassot’s fluxmeter, earth inductor, energy stored in magnetic field transformer, its use and applications

**Maxwell’s E.M Equation:** The displacement current, Maxwell’s equations and their use in propagation of electromagnetic wave, derivation of Gauss’s theorems, Faraday’s-Lenz basis law Biot and Savart’s law, Ampere’s circuital laws, energy of a charged particle in an electromagnetic field general idea about reflection and transmission of electromagnetic waves at the interface between two media.

**Group-B**

**FORENSIC SCIENCE (35%)**

**Unit 5: Introduction to Forensic science**
- Definition
- History
- Principles
- Different branches
- Importance of forensic science
- Existing scenario of forensic science in Nepal
Recent Advances in Forensic Science (DNA profiling, AFIS, Gas Chromatograph Mass Spectroscopy (GC-MS), etc

Unit 6: Crime Scene Examination
- Basic steps in crime scene examination—protection, photography, sketching, search, handling and collection of evidence, modern aids
- Crime Scene Safety—Types of Hazards, Types of Safety, Routes of Exposure, Personnel Protective Equipment
- Physical Evidence—Classification, types, sources, importance, collection, handling, preservation, labeling and forwarding of various physical evidences, Chain of custody

Unit 7: Introduction to Questioned Document Examination
- Importance of document.
- Principle of hand writings/individual characteristics
- Identification of Handwriting
- Standard for comparison
- Procedure for obtaining specimen
- Sources of collected standards
- Care and cautions of documents
- Identification of type writer
- Type of printing
- Printed maters
- Ink and paper analysis
- Charred Document
- Forgery and its types
- Rubber stamp impression, seal
- Travel documents
- Passport examination.
- Currency notes examination/Counterfeit currency

Unit 8: Introduction to Physical Examination
- Forensic Ballistics: Classification of firearms and ammunitions, bore and caliber, Characteristics of tool, Principle of identification of firearms by means of fired cartridge cases and bullets, Difference among homicide, suicide, accident, Physical evidences related to firearms and ammunitions, Method of examinations
- Introduction to Footprints, tool marks, tyre marks, erased chassis and engine numbers, restoration of chassis and engine number
- Glass, soil and paint as physical evidence
Sample Question

Long Questions

1. What are the assumptions of Bohr’s model of H- atom? What are the demerits of Bohr’s model? Sketch the energy level diagram of H-atom. (3+3+4=10 marks)
2. Define Inertial frame of reference? Discuss the Michelson-Morley Experiment (4+6=10 marks)
3. Describe the basic steps involved in crime scene investigation. (10 marks)

Short Questions

1. Differentiate between stream line and turbulent flow? (5 marks)
2. Describe the function of He-Ne Lasers? (5 marks)
3. Derive the equation of work done for a moving charge inside the electric field? (5 marks)
4. Write a short note on Locardo’s principle. (5 marks)

-समाप्त-