

नेपाल सरकार  
गृह मन्त्रालय  
प्रहरी प्रधान कार्यालय  
(मानवश्रोत एवं प्रशासन विभाग, भर्ना तथा छनौट महाशाखा)  
नक्साल, काठमाण्डौ ।

प्राबिधिक प्रहरी निरीक्षक (विधिविज्ञान समूह, **Fingerprint उप-समूह**) को खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम ।

पाठ्यक्रमको रूपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसार दुई चरणमा परीक्षा लिईने छ :-

प्रथम चरण:- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- १५०

द्वितीय चरण:- अन्तरवार्ता (Interview)

पूर्णाङ्क :- २५

प्रथम चरण:- लिखित परीक्षा योजना (Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या x अङ्कभार	समय
प्रथम	CHEMISTRY & Forensic Science	१००	४०	विषयगत	३x१० = ३०	३ घण्टा
					१x४५ = ७०	
द्वितीय	नेपाल प्रहरी सेवा सम्बन्धी	५०	२०	वस्तुगत बहुउत्तर	१० x १ = १०	१ घण्टा १० मिनेट
				विषयगत	लामो उत्तर १x१० = १० छोटो उत्तर ६x५ = ३०	

द्वितीय चरण

परीक्षाको किसिम	पूर्णाङ्क	परीक्षा प्रणाली
ब्यक्तिगत अन्तर्वार्ता	२५	मौखिक

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- प्रथम पत्रमा पाठ्यक्रमका एकाईहरूबाट सोधिने प्रश्नहरूको संख्या निम्नानुसार हुनेछ भने द्वितीय पत्रमा सोधिने प्रश्न संख्या र अंकभार द्वितीय पत्रको पाठ्यक्रममा उल्लेख गरिएको छ ।

विषय	CHEMISTRY									Forensic Science			
पाठ्यक्रमको एकाई	1	2	3	4	5	6	7	8	9	10	11	12	13
लामो प्रश्न	२ वटा									१ वटा			
छोटो प्रश्न	९ वटा									५ वटा			

४. वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरूको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत पुर्णाङ्क प्रदान गरिनेछ, भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ। तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन।
५. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ।
६. अन्तर्वार्ताको अंकभार सम्बन्धमा प्रहरी सेवाको पदमा नियुक्ति र बढुवा गर्दा अपनाउनु पर्ने सामान्य सिद्धान्त, २०६९ को अनुसूची-१९ मा व्यवस्था भए बमोजिम हुनेछ।
७. पाठ्यक्रम लागू मिति :- २०७०/०७/१५ गते।

नेपाल प्रहरी

Subject	Unit	No. of Questions and Weightage\			Full Marks
		Long Answer Type Question (3)	Short Answer Type Questions (14)	Marks	
CHEMISTRY	1. Principles of Qualitative and Quantitative Analysis	2 x 10 marks = 20 marks	9 x 5 marks = 45 marks	65	100
	2. Refining and Purification of Metals				
	3. Comparative Study of s- and p-block Elements and Their Important Compounds				
	4. Chemistry of d-block Elements and Their Compounds				
	5. Aromaticity				
	6. Preparation, Properties and Reactions of Organic Compounds				
	7. Thermodynamics				
	8. Photochemistry				
	9. Conductance				
FORENSIC SCIENCE	10. Introduction to Forensic Science	1 x 10 marks = 10 marks	5 x 5 marks = 25 marks	35	
	11. Crime Scene Investigation				
	12. Medical Jurisprudence				
	13. Introduction to Fingerprint Science				

**Group-A**  
**CHEMISTRY (65%)**

**Inorganic Chemistry**

**Unit 1: Principles of Qualitative and Quantitative Analysis**

Solubility product, common ion effect, their application in group separation, principles of gravimetric and volumetric analysis.

**Unit 2: Refining and Purification of Metals**

Chromatography, ion exchange, solvent extraction, oxidative refining, parting process, zone refining, Mond's process.

**Unit 3: Comparative Study of s- and p-block Elements and Their Important Compounds**

General group trends, electron configuration, atomic radii, ionization potential, electron affinity, electronegativity, inert pair effect.

**Unit 4: Chemistry of d-block Elements and Their Compounds:**

General trends in electronic configuration, ionic and covalent atomic radii, electronegativity, electron affinity, ionization potential, colour and magnetic properties, variable valency, complex formation with reference to 3d-block elements, concept of co-ordination complexes, Werner's theory of co-ordination compounds, comparative study of chemistry of elements of 3d-series (excluding Sc, Ti, V), chemistry of representative compound of 3d-block elements.

**Organic Chemistry**

**Unit 5: Aromaticity**

Aliphatic and aromatic compounds, structure of benzene, Kekule structure, stability of benzene ring (reactions and heats of hydrogenation and combustion), carbon-carbon bond lengths in benzene, resonance structure of benzene, orbital picture of benzene, representation of the benzene ring, Huckel's  $(4n+2)$  rule, nomenclature of benzene derivatives, electrophilic aromatic substitution, effect of substituent groups, determination of relative reactivity, classification of substituent groups, orientation in disubstituted benzenes, mechanism of nitration, sulphonation, halogenation and Friedel-Craft's reactions, reactivities and orientation, theory of orientation, electron release via resonance, effect of halogenation on electrophilic aromatic substitution

**Unit 6: Preparation, Properties and Reactions Organic Compounds:**

Alkane, Alkene, Alkyne, Alcohol, Ether, Aldehyde and Ketone, Carboxylic Acid, Amine, Phenol.

## **Physical Chemistry**

### **Unit 7: Thermodynamics**

Molar heat capacities, relation between  $C_p$  and  $C_v$ , adiabatic expansion of an ideal gas for reversible and irreversible expansion, comparison between isothermal and adiabatic expansion, Joule's –Thompson effect, Inversion temperature, Carnot cycle, thermodynamic efficiency, spontaneous and non-spontaneous changes, second law of thermodynamic, entropy and its mathematical derivation from Carnot cycle, entropy changes, irreversible process, entropy as a measure of randomness, entropy changes and unavailable heat, relation between enthalpy and entropy changes, free energy and work function and their significance, criteria of spontaneity and equilibrium in terms of entropy and free energy

### **Unit 8: Photochemistry**

Absorption of light, Lambert-Beer's law, Grothus Drapter law, Stark Einstein law of photochemical equivalence, quantum yield, reason for high and low quantum yield phosphorescence, flurocence, chemiluminescence and thermoluminescence

### **Unit 9: Conductance**

Electrolytic conductance (specific, equivalent and molar conductance), determination of conductance, Kohlrausch's law of independent migration of ions, variation of conductance with dilution of weak and strong electrolytes, transference number and its experimental determination using Hittorfs and moving boulder method, applications of conductance measurement, determination of solubility and solubility product of sparingly soluble salt, degree of dissociation and dissociation constant of acids, conductometric titration.

## **Group-B FORENSIC SCIENCE (35%)**

### **Unit 10: 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 11: 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 12: Medical Jurisprudence**

- Modes of Death-Coma, syncope, asphyxia
- Changes after death-Primary relaxation, rigor mortis, secondary relaxation (putrefaction, adipocere formation, mummification)
- Death from Asphyxia-Hanging, strangulation, suffocation, drowning
- Types of wounds-Bruises or contusions, abrasions, incised, punctured and lacerated wounds

### **Unit 13: Introduction to Fingerprint Science**

- History of Fingerprinting
- Biological Aspects of Fingerprint Impression-Dermis and Epidermis layers of skin, Development of Ridge & Furrow
- Fundamental Principles of Fingerprint
- Ridge Characteristics
- Fingerprint Patterns
- Chance print and its development
- Classification of Fingerprint-Henry system of classification
- Techniques for developing legible print
- Taking fingerprint of dead bodies
- Classification of Fingerprint-Henry system of classification

## Sample Questions

### Long Answer Type Questions

- a. Describe the variation of conductance with dilution of weak and strong electrolytes. (10 marks)
1. Define aromaticity. Describe the effect of halogenations on electrophilic aromatic substitution. (2 + 8 marks)
2. Describe the basic steps involved in crime scene investigation. (10 marks)

### Short Answer Type Questions

1. Distinguish between aliphatic and aromatic compound. (5 marks)
2. Write short notes on ionization potential and electron affinity. (5 marks)
3. Define common ion effect with a suitable example. (5 marks)
4. Write a short note on Locardo's principle. (5 marks)