

श्री कार्यरथी विभाग भर्ना छनौट निर्देशनालय
जंगी अड्डा

प्रा.सू. केमिष्ट पद (खूला) को लिखित परीक्षाको पाठ्यक्रम

समय: ३ घण्टा

पूर्णाङ्क: १००

उत्तिर्णाङ्क: ४०

उद्देश्यहरु :

यो पाठ्यक्रम नेपाली सेनाको प्रा.सू. केमिष्ट पद (खूला) का उमेदवार छनौट परीक्षाको लागि निर्धारण गरिएको हो । प्रा.सू. केमिष्ट पद (खूला) का लिखित परीक्षामा सरिक हने उमेदवारहरुको पेशा सम्बन्धि विषयलाई आधार मानि प्रश्न सोधिने छ ।

- क) लिखित परीक्षाको माध्यम नेपाली/अंग्रेजी भाषा हुने छ ।
ख) निम्न पत्रहरुको पाठ्यक्रम रुपरेखा अनुसार विषय बस्तु हुने छ ।
ग) लिखित परीक्षावाट छनौट भएको उमेदवारहरुलाई मात्र अर्को चरणको परीक्षामा सम्मिलित गराईने छ ।
घ) प्रश्न पत्र निर्माण गर्दा सम्भव भएसम्म पाठ्यक्रममा समावेश भएका सबै विषयहरुलाई समेट्नु पर्ने छ ।
ङ) नेपाली सेनाको तत्कालिन आवश्यकता तथा विविध परिस्थितीमा नेपाली सेना अनुकूल हुने गरी उल्लेखित विवरणहरुमा हेरफेर हुन सक्ने छ ।
च) पाठ्यक्रम लागू मिति : २०६९।२।१६ गते देखि

प्रश्नको किसिम	प्रश्नको संख्या र अंक	कैफियत
लामो उत्तर दिनु पर्ने प्रश्न	५ X १०= ५०	
छोटो उत्तर दिनु पर्ने प्रश्न	५ X ५= २५	
बस्तुगत प्रश्न	२५ X १= २५	

श्री कार्यरथी विभाग भर्ना छनौट निर्देशनालय
जंगी अड्डा

प्रा.सू. केमिष्ट पद (खूला) को लिखित परीक्षाको पाठ्यक्रम

1. INORGANIC CHEMISTRY

- 1.1 Periodic classification of elements and physical properties
Periodicity of elements, s.p.d. and blocks, long form of periodic table, discussion on properties like atomic, ionic and covalent radii, ionization potential, screening or shielding effect, electronegativity, electron affinity.
- 1.2 Acids and bases
Bronsted and Lewis acid-base concept, hard and soft acids and bases, relative strengths of acids and effect of substituents and solvents on them.
- 1.3 Principles of qualitative and quantitative analysis
Solubility product, common ion effect, their application in group separation, principles of volumetric and gravimetric analysis, analysis of ores found in Nepal.
- 1.4 Environmental pollution
An elementary study of environmental pollution (in air and water) arising due to the presence of dust, carbon, CO, CO₂, NO_x, SO_x, H₂S and heavy
- 1.5 Refining and purification of metals
Chromatography, ion exchange, solvent extraction, Oxidative refining, parting process, zone refining, Mond's process.

2. ORGANIC CHEMISTRY

- 2.1 Organic reaction mechanism
Energetic of reaction, energy profile diagrams, exothermic and endothermic reactions, types of mechanisms, thermodynamic and kinetic requirement of reaction. Methods of determining mechanism.
- 2.2 Substitution and elimination reactions
Structure of alkyl halides, nucleophilic aliphatic substitution reactions, nucleophiles and leaving groups, the S_N2 reaction (kinetics, mechanism, stereo chemistry and reactivity), The S_N1 reaction (kinetics, mechanism, stereo chemistry and reactivity), structure of alkenes, the E₂ reaction (kinetics, mechanism, orientation and reactivity), the E₁ reaction (kinetics, mechanism, orientation and reactivity)
- 2.3 Aromaticity
Aliphatic and aromatic compounds, structure of benzene, Kekulé structure, stability of benzene ring, Huckel's 4n+2 rule, electrophilic aromatic substitution reaction, effect of substituent group, orientation, mechanism of electrophilic aromatic substitution reaction.
- 2.4 Spectroscopic techniques
An elementary study of organic compounds structural elucidation by *uv*, *ir*, *nmr* and mass techniques.
- 2.5 Purification of organic compounds
Methods of purification of crude organic compound, determination of purity of organic compounds, principles and practices behind identification of functional group in organic compounds. Elementary idea of phytochemical analysis, insecticides and chemical preservatives for old books and manuscripts. idea of soft drink and alcohol analysis, general concept of food analysis.

3. PHYSICAL CHEMISTRY

3.1 Gaseous State

Postulates of kinetic molecular theory and their significance, Boyle's law, temperature scale and Charles's law. Dalton's law of partial pressure the ideal gas law, Molecular diffusion and Graham's law, molecular collision and mean free path, intermolecular forces, critical temperature and pressure, departures from ideal gas law, Vander waals constants a and b, liquefaction of gases.

3.2 Liquid state

Vapour pressure, vapour pressure and boiling point, surface tension and its determination using Stalagnometer, viscosity and determination by Ostwald viscometer, applications of surface tension and viscosity measurements.

3.3 Solid state

Crystalline and amorphous solids, classification of solids on the basis of dominant type of bond.

3.4 Chemical Kinetics

Concept of rate of reaction, dependence of reaction rate on concentration, measurement of reaction rate, order and molecularity of a reaction, rate equations for zero, first and second order reactions, the temperature dependence of reaction rates, reaction mechanisms, catalysis

3.5 Thermodynamics

First law of thermodynamics, thermodynamic terms, ISO thermal but not reversible expansion of an ideal gas, ISO thermal reversal expansion of an ideal gas, enthalpy of physical and chemical changes, Hess's law of constant heat summation, spontaneous and non-spontaneous changes, second law of thermodynamics, spontaneity and entropy change, entropy as a measure of randomness, a molecular interpretation of entropy, the free-energy function and equilibrium, free energy and temperature, free energy and the equilibrium constant, criteria of spontaneity.

4. GENERAL

4.1 Treatment of analytical data

Nature of analytical measurements, significant figures, precision and accuracy, errors, basic statistical concepts, average and measures of dispersion, standard deviation, confidence limits, elements of standards and measures.

4.2 Laboratory management

General idea of safety precaution in the laboratory, care and maintenance of laboratory equipments.