

प्रदेश लोक सेवा आयोग

लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत इञ्जिनियरिङ्ग सेवा, जियोलोजी समूह, हाइड्रोजियोलोजी उप-समूह, पाँचौं तहको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइनेछ ।

प्रथम चरण:-लिखित परीक्षा

पूर्णाङ्क:- १००

द्वितीय चरण:-अन्तर्वार्ता

पूर्णाङ्क:- २०

प्रथम चरण:- लिखित परीक्षा योजना (Written Examination)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या x अङ्कभार	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुवैकल्पिक	५० प्रश्न x २ अङ्क = १००	४५ मिनेट

द्वितीय चरण:-

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	बोर्ड अन्तर्वार्ता(Board Interview)

द्रष्टव्य:-

- लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरू सोधिनेछ ।

एकाइ	१	२	३	४	५	६	७	८	९	१०
प्रश्न संख्या	५	५	४	५	३	४	५	३	४	१२

- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको 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 ।
- यस पाठ्यक्रम योजना अन्तर्गतका प्रश्न/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको विज्ञापन हुदाँका वखत (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- पाठ्यक्रम लागू मिति:-

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(५० प्रश्न × २ अङ्क = १०० अङ्क)

1. सार्वजनिक व्यवस्थापन (Public Management)

- 1.1 कार्यालय व्यवस्थापन (Office Management)
  - 1.1.1 कार्यालय (Office) परिचय, महत्व, कार्य र प्रकार
  - 1.1.2 सहायक कर्मचारीका कार्य र गुणहरू
  - 1.1.3 कार्यालय स्रोत साधन (Office Resources): परिचय र प्रकार
  - 1.1.4 कार्यालयमा सञ्चारको महत्व, किसिम र साधन
  - 1.1.5 कार्यालय कार्यविधि (Office Procedure) पत्र व्यवहार (Correspondence), दर्ता र चलानी (Registration & Dispatch), परिपत्र (Circular), तोक आदेश (Order), टिप्पणी लेखन र टिप्पणी तयार गर्दा ध्यान दिनुपर्ने कुराहरू
  - 1.1.6 अभिलेख व्यवस्थापन (Record Management)
- 1.2 निजामती सेवा ऐन र नियमावलीमा भएका देहायका व्यवस्थाहरू
  - 1.2.1 निजामती सेवा, प्रदेश निजामती सेवा र स्थानीय सरकारी सेवाको गठन, संगठन संरचना, पदपूर्ति गर्ने तरिका र प्रक्रियाहरू
  - 1.2.2 कर्मचारीको नियुक्ति, सरुवा, बढुवा, बिदा, विभागीय सजाय र अवकाश
  - 1.2.3 कर्मचारीले पालन गर्नुपर्ने आचरण र कर्तव्यहरू
- 1.3 सरकारी बजेट, लेखा र लेखापरीक्षण प्रणाली सम्बन्धी सामान्य जानकारी
- 1.4 सार्वजनिक सेवा प्रवाहको अर्थ, सेवा प्रवाह गर्ने निकाय, तरिका र माध्यमहरू
- 1.5 सार्वजनिक बडापत्र (Public Charter) महत्व र आवश्यकता
- 1.6 व्यवस्थापनको अवधारणा तथा सार्वजनिक व्यवस्थापनमा निर्देशन, नियन्त्रण, समन्वय, निर्णय प्रक्रिया, उत्प्रेरणा र नेतृत्व सम्बन्धी जानकारी
- 1.7 मानवीय मूल्य मान्यता (Human Values), नागरिक कर्तव्य र दायित्व तथा अनुशासन
- 1.8 Basics of Computer Science (MS Word, Excel, PowerPoint)
- 1.9 जलस्रोत ऐन, २०४९ र जलस्रोत नियमावली, २०५० तथा सिंचाइ नियमावली २०५६, सिंचाइ निति २०७०
- 1.10 सार्वजनिक खरिद ऐन, २०६३ र नियमावली, २०६४ तथा सार्वजनिक खरिद सम्बन्धी प्रदेश नियमावली, २०७६
- 1.11 जलस्रोत वातावरण र प्राकृतिक स्रोत सम्बन्धी नेपालको संविधानमा भएका प्रवाधानहरू

2. Physical Geology and Geology of Nepal Himalaya

- 2.1. The science of geology and its branches
- 2.2. Geologic time scale; hydrologic cycle and rock cycle
- 2.3. Internal structure of the earth, the crust, mantle and core, lithosphere and asthenosphere, pressure and temperature inside the earth. Volcano and land forms due to volcanism.
- 2.4. Earthquakes mechanism of earthquake, seismic waves; seismograph, magnitude and intensity of earthquakes, liquefaction, forecast and prediction of earthquakes, earthquakes in Nepal
- 2.5. History of seismological monitoring in Nepal Himalaya
- 2.6. Geological works of surface water, groundwater, glacier and wind

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- 2.7. Physiography and tectonic divisions of the Nepal Himalaya
- 2.8. Structures and stratigraphy of different tectonic zones of Nepal Himalaya
- 2.9. Weathering, factor controlling weathering
- 2.10. Magmatism, metamorphism and mineral deposit of the Nepal Himalaya.
- 2.11. Recent researches in various aspects of Nepal Himalaya.

### 3. Structural Geology

- 3.1. Definition and scope of structural geology
- 3.2. Geological map and cross-section; orientation of a line (trend and plunge) and a plane (dip and strike); geological compass; stereographic projection; stress and strain, stress in two dimensions; Mohr circle and its use
- 3.3. Primary structures and their importance in structural geological interpretation, unconformity, classification of unconformity.
- 3.4. Folds, classification of folds, criteria of recognition of folds in the field
- 3.5. Faults, classification of faults, criteria of recognition of faults in the field
- 3.6. Joints, classification of joints; study of joints in the field
- 3.7. Foliation, lineation, cleavage, schistosity and their classifications; relationship of foliation and lineation with other structures in the field

### 4. Sedimentary Petrology

- 4.1. Depositional environment: Fluvial, lacustrine and glacial environments
- 4.2. Distribution of sedimentary rocks, formation of sediments
- 4.3. Tectonic setting of sediment accumulations
- 4.4. Geosynclines and plate tectonics
- 4.5. Structure of sedimentary rocks: Erosional structures, depositional structures, syndepositional deformational structures and their significance
- 4.6. Sedimentary rocks - classification, definitions, texture and structures, and compositions of sandstones, conglomerates, mudrocks, limestones and dolomites; Introduction to other sedimentary rocks, evaporites, bedded cherts, and iron deposits; Diagenesis, compaction, cementation, dissolution, replacement, recrystallization, inversion and authigenesis, provenance

### 5. Crystallography and Mineralogy

- 5.1. Introduction to crystallography, morphology of crystals: Point group; symmetry; geometrical operation symmetry notations
- 5.2. Concept of point groups and 32 classes; definition of crystal face, edge, and solid angle; Forty-eight forms
- 5.3. Definition of mineral, rock and ore-forming minerals
- 5.4. Physical properties of minerals
- 5.5. Crystallinity and forms of minerals, habit of minerals, forms of crystalline and cryptocrystalline aggregates
- 5.6. Chemical properties of minerals: native elements, sulphides, halides, oxides, silicates, titanates, phosphates, arsenates and vanadates; nitrates, borates and uranates, sulphates and chromates, tungstates and molybdates, oxalates and hydrocarbons.

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5.7. Optical mineralogy: Snell's law, total internal reflection, critical angle, isotropic and anisotropic minerals, polarization and interference of light, polarizing microscope, pleochroism and birefringence, uniaxial and biaxial crystals, optical properties of minerals- form, cleavage, fracture, and parting, refractive index and relief, Becke line and its use, twinning, colour and pleochroism, properties under crossed polarisers – interference colour, twinning and extinction angle

## 6. Stratigraphy, Paleontology and Historical Geology

### 6.1. Stratigraphy

- 6.1.1. Stratification and sedimentary cycles
- 6.1.2. Principles of stratigraphic classification and correlation
- 6.1.3. International stratigraphic codes
- 6.1.4. Unit and measurement of geological time and geochronology
- 6.1.5. Lithostratigraphy, biostratigraphy and chronostratigraphy, Radiometric dating

### 6.2. Paleontology

- 6.2.1. Fossils and their mode of preservation
- 6.2.2. Evolution of life, definition, concept and method of nomenclature
- 6.2.3. Classification, geographical distribution, morphology, evolution and geological history of different Phylums
- 6.2.4. Fossils found in Nepal

### 6.3. Historical geology

- 6.3.1. Evolution of the Earth
- 6.3.2. Theory of origin of life, index fossils
- 6.3.3. Geological history of Phanerozoic eon, organic life evolution through geological time scale

## 7. Igneous and Metamorphic Petrology

### 7.1. Igneous Petrology

- 7.1.1. General characteristics of igneous rocks.
- 7.1.2. Magma: definition, composition, physico-chemical constitution, primary magma
- 7.1.3. Evolution and differentiation of magmas: fractional crystallization, Magmatic mixing and assimilation
- 7.1.4. Forms and structures of igneous rocks, method of emplacement of intrusive rocks; Extrusive igneous rock: type, their structures and forms, texture
- 7.1.5. The IUGS classification system, chemical classification, characteristics and description of common igneous rocks
- 7.1.6. Distribution of Igneous rocks in Nepal

### 7.2. Metamorphic Petrology

- 7.2.1. General characteristics: definition, types of metamorphism, distribution and nomenclature, structures and textures of metamorphic rocks
- 7.2.2. Shape of minerals, growth and mutual relation of minerals, pressure, temperature and composition in metamorphism

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- 7.2.3. Slate, phyllite, schist, gneiss, amphibolite, marble, quartzite, hornfels, serpentinite, granulite and eclogite and their distribution in Nepal Himalaya
- 7.2.4. Types of metamorphism, contact metamorphism, regional metamorphism and others; metamorphic differentiation, metamorphic reactions, Polymetamorphosm
- 7.2.5. Metamorphic zones, index minerals, isograds
- 7.2.6. Metamoophic facies

## 8. Economic and Exploration Geology

### 8.1. Economic Geology

- 8.1.1. Morphology of ore bodies, classification of mineral deposits, physical characteristics, properties of ore minerals. genesis of mineral deposits:
- 8.1.2. Magmatic concentration, contact metasomatism, hydrothermal, volcanic and submarine exhalative, sedimentation, sublimation, bacteriogenic, residual and mechanical concentration, oxidation and supergene enrichment and Metamorphism
- 8.1.3. Important mineral deposits of Nepal and their distribution in Nepal Himalaya

### 8.2. Exploration Geology

- 8.2.1. Scope and principles of exploration geology, prospecting criteria: Structural tectonic, Lithological, stratigraphical, magmatogenic, geomorphologic, geochemical
- 8.2.2. Prospecting methods and techniques: geological, geophysical, geochemical
- 8.2.3. Sampling and sampling methods

## 9. Engineering Geology

- 9.1. Role of engineering geology in engineering works
- 9.2. Index properties of soil: unit weight, porosity, void ratio, degree of saturation, cohesive and non-cohesive soil, soil consistency, classification of engineering soil, unified soil classification system. Failure criteria of soil.
- 9.3. Rock strength and deformation, discontinuities in rock masses, index tests, engineering classification of rocks. Elements of rock mechanics and engineering properties of rocks.
- 9.4. Mass movements and landslides: causes and classification, control and mitigation measures, landslides of Nepal. Problems of landslides and glacier lake outburst flood (GLOF) in Nepal and their mitigation method.
- 9.5. Failure critenia of slope and Slope stability analysis, construction material
- 9.6. Concept of geohazard, risk and vulnerability
- 9.7. Site investigation

## 10. Hydrogeology

### 10.1. Principle of Groundwater Flow

- 10.1.1. Groundwater and hydrological cycle, occurrence of groundwater, forms of sub-surface water, springs, vertical distribution of groundwater.
- 10.1.2. Hydro-geological properties of soil and rocks, porosity, permeability, void ratio, Transmissivity.
- 10.1.3. Types of aquifers - confined, unconfined, perched and leaky aquifers
- 10.1.4. Groundwater movement, laminar and turbulent flow, Darcy's Law, hydraulic conductivity, estimation of well yields, depth to water level, cone of depression.

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Groundwater exploration technique.

10.2. Pumping Test and Water Pumps

10.2.1. Objective and types of pumping tests and its significance

10.2.2. Well interference and well efficiency

10.2.3. Water pumps and their selection

10.3. Tube Well Drilling

10.3.1. Basic principle of well drilling, dug well, driven wells, jet drilling, rotary drilling, reverse rotary drilling, cable-tool percussion method of drilling and their equipments, drilling bits, drilling fluid

10.3.2. Well design and well development, installation and commissioning. Well rehabilitation.

10.4. Ground water exploration

10.4.1. Geological and hydro geological, exploratory drillings, piezometers, Monitoring of depth to water level.

10.4.2. Geophysical survey (electrical resistivity survey), geophysical well logging (self-potential logging, resistivity logging, gamma-ray logging, etc.)

10.4.3. Ground water quality and its data presentation.

10.4.4. Ground water resources of Nepal: Ground water condition in different geological formation, Ground water potential of Nepal in mountain and terai region.

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