

प्रदेश लोक सेवा आयोग  
बागमती प्रदेश  
नेपाल कृषि सेवा, एगृ. इन्जिनियरिङ समूह, सहायक पाँचौं तह, ओभरसियर पदको खुला प्रतियोगितात्मक  
लिखित परीक्षाका पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसार एक चरणमा परीक्षा लिइने छः

प्रथम चरण:- लिखित परीक्षा	पूर्णाङ्क:- १००
द्वितीय चरण:- अन्तर्वार्ता	पूर्णाङ्क:- २०

प्रथम चरण - लिखित परीक्षा योजना (Written Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न सङ्ख्या X अङ्कभार	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुवैकल्पिक (Multiple Choice)	५० प्रश्न X २ अङ्क=१००	४५ मिनेट

द्वितीय चरण -

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	मौखिक

**द्रष्टव्यः**

१. लिखित परीक्षाको माध्यम भाषा अङ्ग्रेजी वा नेपाली अथवा अङ्ग्रेजी र नेपाली दुवै हुन सक्नेछ ।
२. पाठ्यक्रमको एकाइहरूबाट सोधिने प्रश्न सङ्ख्या निम्नानुसार हुनेछः

पाठ्यक्रमको एकाइ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
प्रश्न सङ्ख्या	4	4	3	2	2	4	3	4	4	4	3	4	3	2	2	2

३. वस्तुगत बहुवैकल्पिक प्रश्नहरूको सही उत्तर दिएमा प्रत्येक सही उत्तर बापत २ अङ्क प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात् ०.४ अङ्क कट्टा गरिनेछ। तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन।
४. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ।
५. कुनै पनि प्रकारको क्याल्कुलेटर (**Calculator**) र विद्युतीय उपकरणहरू (**Electronic devices**) परीक्षा हलमा लैजान र परीक्षामा प्रयोग गर्न पाइने छैन।
६. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ।
७. पाठ्यक्रम लागू मिति:-

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**1. General Agriculture and Agricultural Engineering**

- 1.1. Principles of agronomy (cereals, cash crops, pulses, vegetables, fruits and oilseed)
- 1.2. Elements of soil science (soil fertility, properties and classification)
- 1.3. Soil water, soil moisture tension, infiltration, permeability, wilting coefficient and conductivity
- 1.4. Plant water relationship, evaporation, transpiration and consumptive use, evapotranspiration (ET) estimation methods
- 1.5. Water requirements, irrigation frequencies, and irrigation efficiencies
- 1.6. Methods of Irrigation (Furrow irrigation, border irrigation and check basin irrigation, Sprinkler and drip/tickle irrigation)
- 1.7. Type of drainage system, surface and sub surface drainage system
- 1.8. Water erosion (rain drop erosion, rill erosion, gully erosion, stream channel erosion)
- 1.9. Human, animal, electrical and mechanical powers
- 1.10. Introduction to primary and secondary agricultural implements

**2. Surveying**

- 2.1. **General**
  - 2.1.1. Classifications
  - 2.1.2. Principle of surveying
  - 2.1.3. Selection of suitable method
  - 2.1.4. Scales, plans and maps
  - 2.1.5. Entry into survey field books and level books
- 2.2. **Leveling**
  - 2.2.1. Methods of leveling
  - 2.2.2. Leveling instruments and accessories
  - 2.2.3. Principles of leveling
- 2.3. **Plane Tabling**
  - 2.3.1. Equipment required
  - 2.3.2. Methods of plane tabling
  - 2.3.3. Two and three point problems
- 2.4. **Theodolite and Traverse surveying**
  - 2.4.1. Basic difference between theodolites
  - 2.4.2. Temporary adjustments of theodolites
  - 2.4.3. Fundamental lines and desired relations
  - 2.4.4. Tachometry: stadia method
  - 2.4.5. Trigonometrical leveling
  - 2.4.6. Checks in closed traverse
- 2.5. **Contouring**
  - 2.5.1. Characteristics of contour lines
  - 2.5.2. Method of locating contours
  - 2.5.3. Contour plotting
- 2.6. **Setting Out**
  - 2.6.1. Small buildings
  - 2.6.2. Simple curves

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**3. Construction Materials**

**3.1. Stone**

- 3.1.1. Formation and availability of stones in Nepal
- 3.1.2. Methods of laying and construction with various stones

**3.2. Cement**

- 3.2.1. Different cements: Ingredients, properties and manufacture
- 3.2.2. Storage and transport
- 3.2.3. Admixtures

**3.3. Clay and Clay Products**

- 3.3.1. Brick: type, manufacture, laying, bonds

**3.4. Paints and Varnishes**

- 3.4.1. Type and selection
- 3.4.2. Preparation techniques
- 3.4.3. Use

**4. Mechanics of Materials and Structures**

**4.1. Mechanics of Materials**

- 4.1.1. Internal effects of loading
- 4.1.2. Ultimate strength and working stress of materials

**4.2. Mechanics of Beams**

- 4.2.1. Relation between shear force and bending moment
- 4.2.2. Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading

**4.3. Simple Strut Theory**

**5. Hydraulics**

**5.1. General**

- 5.1.1. Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity
- 5.1.2. Pressure and Pascal's Law

**5.2. Hydro Kinematics and Hydro Dynamics**

- 5.2.1. Energy of flowing liquid: elevation energy, kinetic energy, potential energy, internal energy

**5.3. Measurement of Discharge**

- 5.3.1. Weirs and notches
- 5.3.2. Flumes
- 5.3.3. Discharge formulas

**5.4. Flows**

- 5.4.1. Characteristics of pipe flow and open channel flow

**6. Soil Mechanics**

**6.1. General**

- 6.1.1. Soil types and classification
- 6.1.2. Three phase system of soil
- 6.1.3. Unit weight of soil mass: bulk density, saturated density, submerged density and dry density
- 6.1.4. Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index

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- 6.2. **Soil Water Relation**
  - 6.2.1. Terzaghi's principle of effective stress
  - 6.2.2. Darcy's law
  - 6.2.3. Factors affecting permeability
- 6.3. **Compaction of Soil**
  - 6.3.1. Factors affecting soil compaction\
  - 6.3.2. Optimum moisture content
  - 6.3.3. Relation between dry density and moisture content
- 6.4. **Shear Strength of Soils**
  - 6.4.1. Mohr-Coulomb failure theory
  - 6.4.2. Cohesion and angle of internal friction
- 6.5. **Earth Pressures**
  - 6.5.1. Active and passive earth pressures
  - 6.5.2. Lateral earth pressure theory
  - 6.5.3. Rankine's earth pressure theory
- 6.6. **Foundation Engineering**
  - 6.6.1. Terzaghi's general bearing capacity formulas and their application
- 7. **Structural Design**
  - 7.1. **R.C. Section in Bending**
    - 7.1.1. Under reinforced, over reinforced and balanced sections
    - 7.1.2. Analysis of single and double reinforced rectangular sections
  - 7.2. **Shear and Bond for a R.C Section**
    - 7.2.1. Shear resistance of a R.C section
    - 7.2.2. Types of shear reinforcement and their design
    - 7.2.3. Determination of anchorage length
  - 7.3. **Axially Loaded R.C. columns**
    - 7.3.1. Short and long columns
    - 7.3.2. Design of a rectangular column section
  - 7.4. **Design and Drafting of R.C. Structures**
    - 7.4.1. Singly and doubly reinforced rectangular beams
    - 7.4.2. Simple one way and two way slabs
    - 7.4.3. Axially loaded short and long columns
- 8. **Building Construction Technology**
  - 8.1. **Foundations**
    - 8.1.1. Subsoil exploration
    - 8.1.2. Type and suitability of different foundations: shallow, deep
    - 8.1.3. Shoring and dewatering
    - 8.1.4. Design of simple brick / stone masonry and RCC foundations
  - 8.2. **Walls**
    - 8.2.1. Type of walls and their functions
    - 8.2.2. Choosing wall thickness, height to length relation
    - 8.2.3. Use of scaffolding
  - 8.3. **Damp Proofing**
    - 8.3.1. Sources of dampness
    - 8.3.2. Remedial measures to prevent dampness

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- 8.4. **Concrete Technology**
  - 8.4.1. Constituents of cement concrete
  - 8.4.2. Grading of aggregates
  - 8.4.3. Concrete mixes
  - 8.4.4. Water cement ratio
- 8.5. **Factors affecting strength of concrete**
- 8.6. **Form work**
- 8.7. **Curing**
- 9. **Soil and Water Engineering**
  - 9.1. **Water Conveyance and Control**
    - 9.1.1. Design of open channels, channel linings, drop structures and spillways, water control and division structures
    - 9.1.2. Design of underground pipe conveyance system
  - 9.2. **Land Development**
    - 9.2.1. Land leveling-grading design methods, estimation of earthwork quantities, leveling and grading procedures, equipment for land grading and field layout
  - 9.3. **Ground Water, Irrigation Wells and Pumps**
    - 9.3.1. Ground water and aquifer, hydraulics of the well
    - 9.3.2. Design of wells
    - 9.3.3. Wells construction procedures
    - 9.3.4. Indigenous water lifting devices, positive displacement pumps, centrifugal pumps, vertical turbine pumps, submersible pumps, propeller and mixed flow pumps, selection of pumps and their performances, repaired and maintenance
  - 9.4. **Water Erosion and Control Measures**
    - 9.4.1. Soil losses and its measurement
    - 9.4.2. Erosion control measures (engineering and bioengineering methods)
    - 9.4.3. Conservation structures, watershed management and water harvesting techniques
- 10. **Farm Structure Development**
  - 10.1. **Planning of farmstead, farm residence,**
  - 10.2. **Farm road, farm fencing, farm ponds, farm irrigation and drainage**
  - 10.3. **Animal Shelters**
    - 10.3.1. Dairy barn (housing requirements, stanchion and loose housing barns with milking barn, pen barn)
    - 10.3.2. Poultry housing (housing requirements, types of poultry house, brooder house)
    - 10.3.3. Sheep and goat housing (types, housing requirements, construction material, layout)
    - 10.3.4. Swine housing (types, housing requirements, construction materials, layout)
    - 10.3.5. Aqua cultural engineering (types, pond construction)
  - 10.4. **Storage Structures**
    - 10.4.1. Fodder storage structure, feed storage structure, food grain storage structure, indigenous storage structure, bag storage structure, grain bins, and modern godowns
    - 10.4.2. Farm machinery storage structure and farm workshop
  - 10.5. **Farm and Rural Electrification**
    - 10.5.1. Power transmission and distribution, house wiring and its components
    - 10.5.2. AC motor (single phase and poly phase), starters, selection of electric motors, care and maintenance of electric equipment
    - 10.5.3. Micro-hydro power plants

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## 11. Estimating and Costing

### 11.1. General

- 11.1.1. Main items of work
- 11.1.2. Units of measurement and payment of various items of work and material
- 11.1.3. Standard estimate formats of government offices

### 11.2. Rate Analysis

- 11.2.1. Basic general knowledge of the use of rate analysis norms prepared by Ministry of Works and Transport and the district rates prescribed by district development committee

### 11.3. Specifications

- 11.3.1. Interpretation of specifications

### 11.4. Valuation

- 11.4.1. Methods of valuation

## 12. Construction Management

### 12.1. Organization

- 12.1.1. Need for organization
- 12.1.2. Responsibilities of a civil overseer
- 12.1.3. Relation between owner, contractor and engineer

### 12.2. Site Management

- 12.2.1. Preparation of site plan
- 12.2.2. Organizing labor
- 12.2.3. Measures to improve labor efficiency
- 12.2.4. Accident prevention and safety measures

### 12.3. Contract Procedure

- 12.3.1. Contracts
- 12.3.2. Departmental works and day work
- 12.3.3. Types of contracts
- 12.3.4. Tender and tender notice
- 12.3.5. Earnest money and security deposit
- 12.3.6. Preparation before inviting tender
- 12.3.7. Agreement
- 12.3.8. Conditions of contract
- 12.3.9. Construction supervision

### 12.4. Accounts

- 12.4.1. Administrative approval and technical sanction
- 12.4.2. Familiarity with standard account keeping formats used in governmental organizations
- 12.4.3. Muster roll
- 12.4.4. Completion report

### 12.5. Planning and Control

- 12.5.1. Construction schedule
- 12.5.2. Equipment and materials schedule
- 12.5.3. Construction stages and operations
- 12.5.4. Bar chart

**13. Rural Engineering**

**13.1. Green Roads**

**13.2. Water Supply and Sanitation Engineering**

13.2.1. General

13.2.2. Objectives of water supply system

13.2.3. Source of water and its selection: gravity and artisan springs, shallow and deep wells;  
infiltration galleries

13.2.4. Gravity Water Supply System

13.2.5. Design period

13.2.6. Determination of daily water demand

13.2.7. Determination of storage tank capacity

13.2.8. Selection of pipe

13.2.9. Pipe line design and hydraulic grade line

**13.3. Bio engineering Measures**

**13.4. Renewable Energy**

**14. सान्दर्भिक कानून तथा सम्बद्ध विविध विषय**

१. नेपालको संविधान (भाग १देखि ५ र १३ देखि २० तथा अनुसूचीहरू)

२. भ्रष्टाचार निवारण ऐन, २०५९

३. सूचनाको हकसम्बन्धी ऐन, २०६४

४. निजामती सेवा ऐन, २०४९

५. निजामती सेवा नियमावली, २०५०

६. प्रदेश लोक सेवा आयोग, बागमती प्रदेश सम्बन्धी जानकारी।

७. बागमती प्रदेशको प्रदेश सशासन ऐन, २०७७

८. बागमती प्रदेशको भौगोलिक, आर्थिक तथा सामाजिक क्षेत्रको जानकारी।

९. बागमती प्रदेश सरकार अन्तर्गतका निकायहरू मन्त्रालय, विभाग र कार्यालयहरू।

**15. English:**

**Knowledge on writing correct English sentences, letters, and reports according to English grammar based on the following syntactic functions:**

**a. Parts of Speech:**

**b. Noun**

**c. Pronoun**

**d. Adjective**

**e. Determiner**

**f. Verb**

**g. Adverb**

**h. Preposition**

**i. Conjunction and**

**j. Interjection**

**k. Infinitives and gerunds, reported speech and tenses**

**16. नेपाली:** नेपाली भाषामा स्तरीय शुद्ध शब्द, वाक्यांश र वाक्य लेखनको लागि आवश्यक पर्ने ह्रस्व दीर्घ, ब र व, तथा श, ष, स लगायतका व्याकरणगत शुद्ध लेखनशैलीमा केन्द्रित शुद्ध शब्द, वाक्यांश र वाक्य लेखनसहितको नेपाली भाषाको शुद्धाशुद्धिको ज्ञान

---The End---