

प्रदेश लोक सेवा आयोग, प्रदेश नं.२
कृषि सेवा, एगृ. इन्जिनियरिङ्ग समूह, साहायक पाचौँ, आभरसियर पदका खुला तथा अन्तर सेवा
प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

परीक्षा योजना (Examination Scheme)

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

लिखित परीक्षा पूर्णाङ्क :- १००
अन्तर्वार्ता पूर्णाङ्क :- २०

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या X अङ्कभार	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुउत्तर (Multiple Choice)	५०X२ = १००	४५ मिनेट

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	२०	मौखिक

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनसक्नेछ ।
- पाठ्यक्रमको एकाईवाट निम्नानुसार प्रश्नहरु सोधिनेछन ।

एकाई	१	२	३	४	५	६	७	८	९	१०	११	१२	१३
प्रश्न संख्या	४	४	४	३	३	४	४	४	४	४	४	४	४

- वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरुको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत २ (दुइ) अङ्क प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात ०.४ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- यस पाठ्यक्रममा जेसुकै लखिएको भएता पनि पाठ्यक्रममा परेको ऐन, नियमहरु परीक्षाको मिति भन्दा ३ (तीन) महिना अगाडि (संशोधन भएको वा संशोधन भई हटाइएको वा थप गरी संशोधन भई) कायम रहेकोलाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ ।
- लिखित परीक्षाबाट छनौट भएको उम्मेदवारहरुलाई मात्र अन्तर्वार्तामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम लागू मिति : २०७८/५/४

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कृषि सेवा, एगृ. इन्जिनियरिङ्ग समूह, साहायक पाचौँ, आभरसियर पदका खुला तथा अन्तर सेवा
प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम
विषय - सेवा सम्बन्धी

1. General Agriculture and Agricultural Engineering
 - 1.1 Principles of agronomy (cereals, cash crops, pulses, vegetables, fruits and oilseed)
 - 1.2 Introduction to sociology and rural development
 - 1.3 Elements of soil science (soil fertility, properties and classification)
 - 1.4 Soil water, soil moisture tension, infiltration, permeability, wilting coefficient and conductivity
 - 1.5 Plant water relationship, evaporation, transpiration and consumptive use, evapotranspiration (ET) estimation methods
 - 1.6 Water requirements, irrigation frequencies, and irrigation effectiveness
 - 1.7 Method of Irrigation (Furrow irrigation, border irrigation and check basin irrigation, Sprinkler and drip/tickle irrigation)
 - 1.8 Type of drainage system, surface and sub surface drainage system
 - 1.9 Ground water and aquifers, hydraulics of wells
 - 1.10 Water erosion (rain drop erosion, rill erosion, gully erosion, stream channel erosion)
 - 1.11 Human, animal, electrical and mechanical powers
 - 1.12 Introduction to primary and secondary agricultural implements
 - 1.13 Province no.2, Province Civil Service Act, 2077
 - 1.14 Province no.2, Province Public Service Commission Act, 2076 and Province Public Service Commission Rules, 2078
 - 1.15 Province no.2, Agriculture related Act, Rules, Plan and Policies
 - 1.16 Province no.2, Agriculture status and statistics
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
- 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 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
 - 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
 - 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 Design of wells
- 9.3.2 Wells construction procedures
- 9.3.3 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, water supply and sanitation

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
- 12.2.3 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

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

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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

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