

प्रदेश लोक सेवा आयोग, प्रदेश नं. २
इञ्जिनियरिङ्ग सेवा, सिभिल समूह अन्तर्गतका जेनरल, हाईवे, स्यानीटरी, इरिगेशन र हाइड्रोलोजी उपसमूह
सहायक पाचौं पदको खुला तथा अन्तर सेवा प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छ :

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

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या 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
अन्तर्वाता	२०	मौखिक

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ।
- लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरू सोधिनेछ।

पाठ्यक्रमको एकाई	1	2	3	4	5	6	7	8	9	10	11	12	13
प्रश्न संख्या	4	4	4	4	4	4	4	4	4	4	4	4	2

- 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 पत्र/विषयको विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेको कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएको वा संशोधन भई हटाईएको वा थप गरी संशोधन भई) कायम रहेकोलाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ।
- प्रथम चरणको लिखित परीक्षाबाट छनौट भएको उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वातामा सम्मिलित गराइनेछ।
- पाठ्यक्रम लागू मिति : २०७८/५/४

पत्र/ विषय :- सेवा सम्बन्धी

1. Surveying

1.1 General

1.1.1 Classifications

1.1.2 Principle of surveying

1.1.3 Selection of suitable method

1.1.4 Scales, plans and maps

1.1.5 Entry into survey field books and level books

1.2 Levelling

1.2.1 Methods of levelling

1.2.2 Levelling instruments and accessories

1.2.3 Principles of levelling

1.3 Plane Tabling

1.3.1 Equipments required

1.3.2 Methods of plane tabling

1.3.3 Two and three point problems

1.4 Theodolite and Traverse surveying

1.4.1 Basic difference between different theodolites

1.4.2 Temporary adjustments of theodolites

1.4.3 Fundamental lines and desired relations

1.4.4 Tacheometry: stadia method

1.4.5 Trigonometrical levelling

1.4.6 Checks in closed traverse

1.5 Contouring

1.5.1 Characteristics of contour lines

1.5.2 Method of locating contours

1.5.3 Contour plotting

1.6 Setting Out

1.6.1 Small buildings

1.6.2 Simple curves

2. Construction Materials

2.1 Stone

2.1.1 Formation and availability of stones in Nepal

2.1.2 Methods of laying and construction with various stones

2.2 Cement

2.2.1 Different cements: Ingredients, properties and manufacture

2.2.2 Storage and transport

2.2.3 Admixtures

2.3 Clay and Clay Products

2.3.1 Brick: type, manufacture, laying, bonds

2.4 Paints and Varnishes

2.4.1 Type and selection

2.4.2 Preparation techniques

2.4.3 Use

2.5 Bitumen

2.5.1 Type

2.5.2 Selection

2.5.3 Use

3. Mechanics of Materials and Structures

3.1 Mechanics of Materials

3.1.1 Internal effects of loading

3.1.2 Ultimate strength and working stress of materials

3.2 Mechanics of Beams

3.2.1 Relation between shear force and bending moment

3.2.2 Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading

3.3 Simple Strut Theory

4. Hydraulics

4.1 General

4.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity

4.1.2 Pressure and Pascal's law

4.2 Hydro-Kinematics and Hydro-Dynamics

4.2.1 Energy of flowing liquid: elevation energy, Kinetic energy, potential energy, internal energy

4.3 Measurement of Discharge

4.3.1 Weirs and notches

4.3.2 Discharge formulas

4.4 Flows

4.4.1 Characteristics of pipe flow and open channel flow

5. Soil Mechanics

5.1 General

5.1.1 Soil types and classification

5.1.2 Three phase system of soil

5.1.3 Unit Weight of soil mass: bulk density, saturated density, submerged density and dry density

5.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index

5.2 Soil Water Relation

5.2.1 Terzaghi's principle of effective stress

5.2.2 Darcy's law

5.2.3 Factors affecting permeability

5.3 Compaction of soil

5.3.1 Factors affecting soil compaction

5.3.2 Optimum moisture content

5.3.3 Relation between dry density and moisture content

5.4 Shear Strength of Soils

5.4.1 Mohr-Coulomb failure theory

5.4.2 Cohesion and angle of internal friction

5.5 Earth Pressures

5.5.1 Active and passive earth pressures

5.5.2 Lateral earth pressure theory

5.5.3 Rankine's earth pressure theory

5.6 Foundation Engineering

5.6.1 Terzaghi's general bearing capacity formulas and their application

6. Structural Design

- 6.1 R.C. Sections in Bending
 - 6.1.1 Under reinforced, over reinforced and balanced sections
 - 6.1.2 Analysis of single and double reinforced rectangular sections
- 6.2 Shear and Bond for R.C. Sections
 - 6.2.1 Shear resistance of a R.C. section
 - 6.2.2 Types of Shear reinforcement and their design
 - 6.2.3 Determination of anchorage length
- 6.3 Axially Loaded R.C. Columns
 - 6.3.1 Short and long columns
 - 6.3.2 Design of a rectangular column section
- 6.4 Design and Drafting of R.C. Structures
 - 6.4.1 Singly and doubly reinforced rectangular beams
 - 6.4.2 Simple one-way and two-way slabs
 - 6.4.3 Axially loaded short and long columns

7. Building Construction Technology

- 7.1 Foundations
 - 7.1.1 Subsoil exploration
 - 7.1.2 Type and suitability of different foundations: Shallow, deep
 - 7.1.3 Shoring and dewatering
 - 7.1.4 Design of simple brick or stone masonry foundations
- 7.2 Walls
 - 7.2.1 Type of walls and their functions
 - 7.2.2 Choosing wall thickness, Height to length relation
 - 7.2.3 Use of scaffolding
- 7.3 Damp Proofing
 - 7.3.1 Source of Dampness
 - 7.3.2 Remedial measures to prevent dampness
- 7.4 Concrete Technology
 - 7.4.1 Constituents of cement concrete
 - 7.4.2 Grading of aggregates
 - 7.4.3 Concrete mixes
 - 7.4.4 Water cement ratio
 - 7.4.5 Factors affecting strength of concrete
 - 7.4.6 Form work
 - 7.4.7 Curing
- 7.5 Wood work
 - 7.5.1 Frame and shutters of door and window
 - 7.5.2 Timber construction of upper floors
 - 7.5.3 Design and construction of stairs
- 7.6 Flooring and Finishing
 - 7.6.1 Floor finishes: brick, concrete, flagstone
 - 7.6.2 Plastering

8. Water Supply and Sanitation Engineering

- 8.1 General
 - 8.1.1 Objectives of water supply system
 - 8.1.2 Source of water and its selection: gravity and artisan springs, shallow and deep wells; infiltration galleries.

8.2 Gravity Water Supply System

8.2.1 Design period

8.2.2 Determination of daily water demand

8.2.3 Determination of storage tank capacity

8.2.4 Selection of pipe

8.2.5 Pipe line design and hydraulic grade line

8.3 Design of Sewer

8.3.1 Quantity of sanitary sewage

8.3.2 Maximum, Minimum and self cleaning velocity

8.4 Excreta Disposal and Unsewered Area

8.4.1 Pit latrine

8.4.2 Design of septic tank

9. Irrigation Engineering

9.1 General

9.1.1 Advantages and Disadvantages of irrigation

9.2 Water Requirement

9.2.1 Crop season and principal crops

9.2.2 Base period

9.3 Flow irrigation Canals

9.3.1 Canal losses and their minimization

9.3.2 Maximum and minimum velocities

9.3.3 Design of irrigation canal section based on manning's formula

9.3.4 Need and location of spillways

9.3.5 Head works for small canals

10. Highway Engineering

10.1 General

10.1.1 Introduction to transportation systems

10.1.2 Historic development of roads

10.1.3 Classification of road in Nepal

10.1.4 Basic requirements of road alignment

10.2 Geometric Design

10.2.1 Basic design control and criteria for design

10.2.2 Elements of cross section, typical cross-section for all roads in filling and cutting

10.2.3 Camber

10.2.4 Determination of radius of horizontal curves

10.2.5 Superlevation

10.2.6 Sight distances

10.2.7 Gradient

10.2.8 Use of Nepal Road Standard and subsequent revision in road design

10.3 Drainage System

10.3.1 Importance of drainage system and requirements of a good drainage system

10.4 Road Pavement

10.4.1 Pavement structure and its components: subgrade, sub-base, base and surface courses

10.5 Road Machineries

10.5.1 Earth moving and compacting machines

10.6 Road Construction Technology

- 10.7 Bridge
 - 10.7.1 T-beam bride
 - 10.7.2 Timber bridges
- 10.8 Road Maintenance and Repair
 - 10.8.1 Type of maintenance Works
- 10.9 Tracks and Trails

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 on 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
 - 11.4.2 Basic general knowledge of standard formats used by commercial banks and NIDC for 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
- 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. Airport Engineering

13.1 General

- 13.1.1 Introduction to Air Transport System
- 13.1.2 Historic development of Airports in Nepal
- 13.1.3 Classification of Airports
- 13.1.4 Airport terminologies

13.2 Design

- 13.2.1 Basic design control and criteria for design
- 13.2.2 General items contained in ANNEX 14 (ICAO Publication)
- 13.2.3 Planning of Airport and its elements
- 13.2.4 Terminal Building and Control Tower
- 13.2.5 Drainage System
- 13.2.6 Geometric design, pavement structure and its component
- 13.2.7 Basic knowledge of Heliport and Hangers

13.3 Airport Maintenance

- 13.3.1 Types of maintenance
 - 13.3.2 Methods of maintenance
 - 13.4.1 Province no.2 Province Civil Service Act, 2077
 - 13.4.2 Province no . 2 Province Public Service Commission Act and rules.
 - 13.4.3 Province no . 2 Engineering Related Act, Rules and Regulations.
 - 13.4.4 Province no . 2 Engineering Related Status and Statistics.
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