लोक सेवा आयोग

स्थानीय तह अन्तर्गतका प्राविधिक तर्फ इञ्जिनियरिङ्ग सेवा, सिभिल समूह, पाँचौं तह, सव-इञ्जिनियर पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

पाठ्यक्रमको रुपरेखा:– यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षालिइने छ :

प्रथम चरण :– लिखित परीक्षा पूर्णाङ्क :– १००
द्वितीय चरण :– 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 बहुवैकल्पिक (Multiple Choice)	५०प्रश्न X २ अङ्क = १००	४५ मिनेट

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	मौखिक

द्रष्टव्य :

१. यो पाठ्यक्रम योजनालाई **लिखित परीक्षा र अन्तर्वार्ता** गरी दुई चरणमा विभाजन गरिएको छ ।

२. **प्रश्नपत्र अंग्रेजी भाषामा हुनेछ ।**

३. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको 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 ।

५. परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

६. लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

पाठ्यक्रमका एकाइ	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
प्रश्न संख्या	4	4	4	4	4	4	4	4	6	6	2	2	2

७. आयोगबाट संचालन हुने परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।

८. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधनभई हटाईएका वा थप गरी संशोधनभई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

९. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।

१०. पाठ्यक्रम लागू मिति :- २०७६/०२/१२

लोक सेवा आयोग

स्थानीय तह अन्तर्गतका प्राविधिक तर्फ इञ्जिनियरिङ्ग सेवा, सिभिल समूह, पाँचौं तह, सव-इञ्जिनियर पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

पत्र/ विषय :– सेवा सम्वन्धी

1. Surveying

- 1.1 General
  - 1.1.1 Principle and types of surveying
  - 1.1.2 Units, scales and maps
  - 1.1.3 Field books and Level books
- 1.2 Levelling
  - 1.2.1 Principles and methods of levelling
  - 1.2.2 Levelling instruments and accessories
- 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: Small buildings and 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: Type and selection; preparation techniques and use
- 2.5 Bitumen: Type, selection and 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 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: 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. Structures

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 Design and Working System 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 and thickness of walls
7.2.2 Use of scaffolding
7.3 Damp Proofing
7.3.1 Source of Dampness
7.3.2 Remedial measures for damp proofing
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 Need for irrigation; advantages of irrigation
- 9.1.2 Sources of irrigation: water, river & streams, ground water and others
- 9.1.3 Methods of irrigation: surface, sub-surface and others

9.2 Irrigation Water Requirement
- 9.2.1 Crop season, principal crops, and crop water requirements
- 9.2.2 Base period & duty

9.3 Irrigation Canals
- 9.3.1 Canal losses and their minimization
- 9.3.2 Irrigation requirements and design discharge of canal permissible velocities for different canals
- 9.3.3 Design of canal based on Manning's & Lacey's formulae
- 9.3.4 Need and location of escapes
- 9.3.5 Components of distribution system

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 Standardand 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: 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: T-beam bride and Timber bridges

10.8 Road Maintenance and Repair: Type of maintenance works

10.9 Tracks and Trails

10.10 **Airport Engineering:** Planning and layout of Heliports; Terminal Building and Control Tower; Drainage System for Airports

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 Sub- engineer

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 Procurement and Contract Procedure

12.3.1 Contracts and its types

12.3.2 Departmental works and day-work

12.3.3 Preparation of tender document

12.3.4 Tender procedure

12.3.5 Contract agreement

12.3.6 Conditions of contract

12.3.7 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. General information about legislations

8.1 नेपालको संविधान (भाग १, २, ३, १७ र १८ तथा अनुसूचीहरू) (The Constitution of Nepal (From Parts 1, 2, 3, 17 & 18, and Schedules))

8.2 स्थानीय सरकार सञ्चालन ऐन, २०७४ मा पूर्वाधार विकास सम्बन्धी व्यवस्था (Local Government Operation Act, 2074 (related to local infrastructures development))