

प्रदेश लोक सेवा आयोग
प्रदेश नं. १, विराटनगर
स्थानीय सरकारी सेवा अन्तर्गत प्राविधिक तर्फ इञ्जिनियरिङ्ग सेवा, सिभिल समूह, सहायकस्तर पाँचौं तह (सब-इञ्जिनियर) पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमलाई निम्नानुसार विभाजन गरिएको छः

प्रथम चरणः लिखित परीक्षा पूर्णाङ्कः १००
द्वितीय चरणः अन्तर्वार्ता पूर्णाङ्कः २०

परीक्षा योजना (Examination Scheme)

प्रथम चरणः लिखित परीक्षा (Written Examination)

बिषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या अङ्कभार	समय
सेवा सम्बन्धी	१००	४०	बस्तुगत बहुबैकल्पिक (Multiple choice)	५० प्रश्न X २ अङ्क=१००	४५ मिनेट

द्वितीय चरणः अन्तर्वार्ता

बिषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	मौखिक

द्रष्टव्यः

- यो पाठ्यक्रम योजनालाई लिखित परीक्षा र अन्तर्वार्ता गरी दुई चरणमा विभाजन गरिएको छ।
- प्रश्नपत्र अङ्ग्रेजी भाषामा हुनेछ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अङ्ग्रेजी अथवा नेपाली र अङ्ग्रेजी दुवै हुन सक्नेछ।
- लिखित परीक्षामा निम्नानुसार प्रश्नहरू 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

- बस्तुगत बहुबैकल्पिक (Multiple choice) प्रश्नहरूको उत्तर सही दिएमा प्रत्येक उत्तर बापत २ (दुई) अङ्क प्रदान गरिनेछ भने 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।
- बहुबैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै पनि प्रकारको क्यालकुलेटर (Calculator), मोबाइल फोन वा अन्य विद्युतीय उपकरण प्रयोग गर्न पाइने छैन।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र तथा विषयका विषयवस्तुमा जे सुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेका लाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ।

८. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ।
९. लिखित परीक्षा र अन्तर्वार्ताको कुल अङ्क योगका आधारमा परीक्षाफल प्रकाशित गरिनेछ।
१०. पाठ्यक्रम लागू मिति: २०७७/१०/११

प्रदेश लोक सेवा आयोग

प्रदेश नं. १, विराटनगर

स्थानीय सरकारी सेवा अन्तर्गत प्राविधिक तर्फ इञ्जिनियरिङ्ग सेवा, सिभिल समूह, सहायकस्तर पाँचौं तह (सब-इञ्जिनियर) पदको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

पत्र/विषय :- सेवा सम्बन्धी

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 and aggregate

2.1.1 Formation and availability of stones in Nepal

2.1.2 Methods of laying and construction with various stones

2.1.3 Fine aggregates and Coarse aggregates

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

2.6 Metals and Alloys

2.7 Timber and Wood

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 Superelevation
- 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: 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 bridge 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 Safety Management at site
- 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

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

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

13.3 Nepal National Building Code, 2060, Levels of Application and Mandatory Rules of Thumb

13.4 बस्ती विकास, सहरी योजना तथा भवन निर्माण सम्बन्धी मापदण्ड, २०७२

Model Questions

1. Mostly used pipe for plumbing is
 - a. steel
 - b. cast iron
 - c. cement concrete
 - d. galvanized iron
2. Septic tanks are best suited for
 - a. municipalities
 - b. industries
 - c. scatter residences
 - d. congested areas
3. Propose of seal coat is to provide,
 - a. an even surface
 - b. required grade
 - c. camber
 - d. an impervious layer

4. Formation whitish deposit on the bricks due to the presence of excess salt is called;
 - a. Efflorescence
 - b. disintegration
 - c. warping
 - d. floating

5. An area of one hector is equal to;
 - a. 10 M²
 - b. 10000 M²
 - c. 100 M²
 - d. 1000M²

6. The increase in volume of dry sand when water is added is called;
 - a. honey combing
 - b. bulking
 - c. segregation
 - d. bleeding

7. During transportation of concrete the separation of coarse aggregate from mortar is called,
 - a. separation
 - b. creeping
 - c. segregation
 - d. bleeding

8. A document containing detailed description of all the items of work (but their quantities are not mentioned) together with their current rates is called;
 - a. tender
 - b. schedules of rate
 - c. analysis of rate
 - d. abstract estimate

9. The quantity of soling is obtained in;
 - a. Cubic meter
 - b. meter
 - c. lump sum
 - d. square meter

10. A shear wall is designed to carry
 - a. Axial shear and bending forces
 - b. Shear force
 - c. Shear and bending force
 - d. Bending forces only