प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश तथा स्थानीय तह तर्फको नेपाल इञ्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उप-समूह, पाँचौं तह,सब इन्जिनियर पदको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम एवं परीक्षा योजना

पाठ्यक्रमको रूपरेखाः- यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छ ।

क. प्रथम चरणः लिखित परीक्षा (Written Examination) पूर्णाङ्कः १००

ख. द्वितीय चरणः अन्तर्वार्ता (Interview) पूर्णाङ्कः १५

परीक्षा योजना (Examination Scheme)

प्रथम चरणः- 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 २अङ्क=१००	४५ मिनेट

द्वितीय चरणः- अन्तर्वार्ता (Interview)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	१५	मौखिक

द्रष्टव्यः

१. पाठ्यक्रमका एकाईबाट निम्नानुसार प्रश्नहरु सोधिनेछन् ।

Part	I Civil Engineering				II Building				III Architecture			IV **Miscellaneous**
एकाई	१	२	३	४	५	६	७	८	९	१०	११	१२
प्रश्न संख्या	५	५	५	६	३	२	५	४	५	२	४	४

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुन सक्नेछ ।

३. लिखित परीक्षामा गल्ती गरेको प्रश्नोत्तरका लागि २० प्रतिशत अङ्क कट्टा गरिने छ। तर उत्तर नदिएमा त्यस वापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

४. यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरु 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. प्रथम चरणको लिखित परिक्षावाट छनौट भएका उम्मेद्वारलाई मात्र द्वितिय चरणको अन्तर्वार्तामा सम्मिलित गराइने छ।

६. पाठ्यक्रम लागू हुने मिति २०७८।०८।०७

प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश तथा स्थानीय तह तर्फको नेपाल इञ्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उप-समूह, पाँचौं तह,सब इन्जिनियर पदको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम एवं परीक्षा योजना

Part I Civil Engineering

1. Drawing

1.1. General

- 1.1.1. Importance, aims and objectives of drawing
- 1.1.2. Drawing equipment
- 1.1.3. Architectural discipline
- 1.1.4. Standard drawing sheets sizes
- 1.1.5. Drafting techniques and methods in common practice
- 1.1.6. Scales: Choice, use and conversion
- 1.1.7. Use of Computers and common software (Autocad) for drafting and printing.

1.2. Measured Drawing

- 1.2.1. Methods of measurement of horizontal and vertical dimensions
- 1.2.2. Sectional measurements
- 1.2.3. Dimensioning of sketches
- 1.2.4. Checking for missing details in field

1.3. Working Drawing

- 1.3.1. Role of working drawing
- 1.3.2. Interrelationship with estimate and specification
- 1.3.3. Construction detailing in plan and section
- 1.3.4. Significance of detailing in terms of accuracy of estimation, bill of quantities and construction supervision
- 1.3.5. Working drawing for private and public buildings, sanitary installation, Heating Ventilation and Air Conditioning (HVAC) and electrification works
- 1.3.6. Structural working drawings

2. Estimating and Costing

2.1. General

- 2.1.1. Purpose of estimating
- 2.1.2. Main items of work
- 2.1.3. Units of measurement and payment of various items of work and materials
- 2.1.4. Degree of accuracy
- 2.1.5. Standard estimate formats of Government of Nepal
- 2.1.6. Data for estimate
- 2.1.7. Preliminary estimate
- 2.1.8. Approximate quantity estimate
- 2.1.9. Detailed estimate
- 2.1.10. Revised estimate

2.2. Rate Analysis

2.2.1. Manufactures' cost
2.2.2. Transportation cost and analysis
2.2.3. Overheads
2.2.4. Need for contingencies and their types
2.2.5. Use of Government Rate Analysis Norms

2.3. Specifications
2.3.1. Purpose
2.3.2. Types
2.3.3. Necessity
2.3.4. Interpretation of Specifications

2.4. Estimating
2.4.1. Earthwork
2.4.2. Estimate of buildings
2.4.3. Estimate of sanitary installations and fittings
2.4.4. Estimate of electrical and Heating Ventilation and Air Conditioning (HVAC) fittings
2.4.5. Maintenance works

2.5. Valuation
2.5.1. Purpose of valuation
2.5.2. Methods of valuation
2.5.3. Standard formats and norms used for Property Valuation in Nepal

3. Management

3.1. Organization
3.1.1. Need for organization
3.1.2. Building agencies
3.1.3. Structure organization of the Ministry of Physical Infrastructure Development Sudurpashchim Province / Division and Local level offices
3.1.4. Responsibilities of a building sub engineer
3.1.5. Relation between owner, contractor and consultants

3.2. Accounts
3.2.1. Familiarity with related Nepalese accounting system
3.2.2. Administrative approval and technical sanction

3.3. Planning and Control
3.3.1. List of activities
3.3.2. Construction schedule
3.3.3. Equipment, Material and Human Resources schedule

3.3.4. Construction stages and operations
3.3.5. Bar Chart
3.4. Municipal Building By-laws
3.4.1. Sheet sizes
3.4.2. Scales
3.4.3. Setback
3.4.4. Height controls
3.4.5. Other requirements specifies by the municipalities
3.4.6. Floor Area Ratio (FAR)

4. Building Service/Utilities

4.1. Water Supply
4.1.1. General principle of water supply
4.1.2. Water requirement standard for different buildings
4.1.3. Storage and distribution of water
4.1.4. Heating of water, storage and distribution requirements
4.2. Sanitation and Waste disposal system
4.2.1. Septic tank, soak pit, vent and manhole
4.2.2. Pipes for different sewage
4.2.3. Incinerators
4.3. Electrical and Heating Ventilation and Air Conditioning (HVAC) System
4.3.1. General principles of electrical installation and distribution
4.3.2. Wiring systems in private and public building
4.3.3. Ducts for electrical distribution
4.3.4. Safety precautions
4.3.5. Lift, Escalators and ACs
4.4. Lighting
4.4.1. General principles of lighting
4.4.2. Illumination requirements and standards
4.4.3. Combination of artificial and natural light
4.4.4. Lighting fixtures

Part II Building

5. Surveying

5.1. General
5.1.1. Primary divisions of survey
5.1.2. Classification based on instruments and on methods

5.1.3. Basic principle of surveying
5.1.4. Scales, plans and maps
5.1.5. System of field booking of surveying and levelling data
5.1.6. Theodolite survey

5.2. Levelling
5.2.1. Classification of levelling work
5.2.2. Methods of levelling
5.2.3. Levelling instruments and accessories
5.2.4. Principles of levelling
5.2.5. Temporary and permanent adjustments of a level
5.2.6. Profile levelling
5.2.7. Booking and reducing levels

5.3. Errors and their effects
5.3.1. Kinds of errors
5.3.2. Source of errors in chaining, levelling, plane tabling and compass surveying
5.3.3. Effects of errors and its corrections

5.4. Plane Tabling
5.4.1. Equipment used
5.4.2. Working operations
5.4.3. Methods of plane tabling
5.4.4. Merits and demerits of plane tabling

5.5. Contouring
5.5.1. Definitions of terms
5.5.2. Use of contour maps

5.6. Setting out
5.6.1. Small buildings
5.6.2. Simple curves
5.6.3. Locating the boundaries of lands

6. **Construction Materials**

6.1. Stone
6.1.1. Rocks and their characteristics
6.1.2. Formation and availability of stones in Nepal
6.1.3. Quarrying: excavation, Wedging and blasting
6.1.4. Methods of laying and construction with various stones

6.2. Aggregates
6.2.1. Fine aggregates

6.2.2. Coarse aggregates
6.2.3. Availability and Practice in Nepal

6.3. Cement
6.3.1. Different cements: ingredients, properties and manufacture and physical test
6.3.2. Storage and transport
6.3.3. Admixtures

6.4. Metals and Alloys
6.4.1. Wrought iron: Properties, use
6.4.2. Steel: composition, properties, appearance, strength, constructional forms and manufacture
6.4.3. Corrosion and its prevention
6.4.4. Brass: uses

6.5. Brick
6.5.1. Type
6.5.2. Manufacture
6.5.3. Laying
6.5.4. Availability and practice in Nepal

6.6. Lime
6.6.1. Manufacture
6.6.2. Types and properties
6.6.3. Uses

6.7. Paints and Varnishes
6.7.1. Type and selection
6.7.2. Preparation techniques
6.7.3. Uses

6.8. Floor Finishes
6.8.1. Punning
6.8.2. Tiles: mosaic, clay, concrete, vinyl
6.8.3. Marble, granite, flagstones, interlocking blocks
6.8.4. Wooden boarding and parquetting

6.9. Wall Finishes
6.9.1. Plasters: cement, lime, mud, plaster of paris(POP), wall putty
6.9.2. Pointing: cement, lime
6.9.3. Cladding: wood, stone, tiles

6.10. Roofing Materials
6.10.1. Clay tiles, ceramic tiles and slates

6.10.2. CGI and UPVC

6.11. Miscellaneous Materials

6.11.1. Glass

6.11.2. Plastics

6.11.3. Asphalt and Bitumen

6.11.4. Surkhi

6.11.5. Modern and alternative construction materials and their current use in Nepal

7. **Structural Design**

7.1. Timber Structures

7.1.1. Allowable stresses

7.1.2. Design of compression members

7.1.3. Design of solid rectangular beams

7.1.4. Types of joints and their connections

7.2. Steel Structures

7.2.1. Rivetted and welded connections: types, uses, detailing

7.2.2. Detailing of simple roof trusses

7.2.3. Detailing of rolled steel beams

7.2.4. Detailing of column bases

7.3. R.C. Sections in Bending

7.3.1. Basis assumptions

7.3.2. Position of neutral axis

7.3.3. Moment of resistance

7.3.4. Under reinforced, over reinforced and balanced sections

7.3.5. Analysis of singly and doubly reinforced rectangular sections

7.3.6. Analysis of singly reinforced flanged sections

7.4. Shear and Bond for Reinforced Concrete (RC) Sections

7.4.1. Behaviour of R.C. section in shear

7.4.2. Shear resistance of R.C. section

7.4.3. Types of shear reinforcement and their design

7.4.4. Local and anchorage bond

7.4.5. Determination of anchorage length

7.4.6. Bar curtailment principle

7.5. Axially Loaded R.C

7.5.1. Short and long columns

7.5.2. Design of a rectangular column section

7.5.3. Reinforcement detailing

7.6. Design and Detailing of R.C Structures
- 7.6.1. IS code requirements
- 7.6.2. Methods of design
- 7.6.3. Singly reinforced T and L beams
- 7.6.4. Simple one-way and two-way slabs
- 7.6.5. Simple pad footings for columns
- 7.6.6. Preparation of bar bending for RC design

7.7. Earthquake Resistant Design of Non-engineered Structures
- 7.7.1. History of Earthquake in Nepal and damages to buildings
- 7.7.2. Introduction to Nepal National Building Code
- 7.7.3. Weakness of existing building
- 7.7.4. Site consideration
- 7.7.5. Building form, shape and size
- 7.7.6. Size and location of openings
- 7.7.7. Selection of materials
- 7.7.8. Construction technology
- 7.7.9. Seismic resistant components: through stone, vertical and horizontal reinforcement, diaphragm, boxing of building, lateral restrainers, unsupported length of wall, corner and junction of wall/connection of building components
- 7.7.10. General requirements for ductile detailing of RC columns, beams and slabs.

8. Building Construction Technology

8.1. Foundations
- 8.1.1. Function and necessity
- 8.1.2. Subsoil exploration: test pit
- 8.1.3. Safe bearing capacity of soils and its improvement
- 8.1.4. Type and suitability of different foundations: shallow, deep (combined footing, piles)
- 8.1.5. Methods of excavating
- 8.1.6. Shoring and dewatering
- 8.1.7. Elements of simple spread foundation
- 8.1.8. Stone masonry foundations
- 8.1.9. Raft foundation

8.2. Walls
- 8.2.1. Types of walls: solid wall, partition wall, cavity wall, curtain wall
- 8.2.2. Features and their functions
- 8.2.3. Types of stone masonry: rubble, hammer dressed and ashlars masonry

8.2.4. Brick Masonry: English, Flemish, garden rat trap
8.2.5. Types of concrete blocks
8.2.6. Choosing wall thickness, height to length relation
8.2.7. Use of scaffolding
8.2.8. Procedure of constructing various masonry walls

8.3. Damp Proofing
8.3.1. Source of dampness
8.3.2. Remedial measures to prevent dampness
8.3.3. Vertical and horizontal damp proofing
8.3.4. Damp proofing materials

8.4. Concrete Technology
8.4.1. Constituents, mixing and use of lime concrete
8.4.2. Constituents, of cement concrete
8.4.3. Grading of aggregates
8.4.4. Concrete mixes
8.4.5. Water cement ratio
8.4.6. Workability
8.4.7. Concrete laying
8.4.8. Factors affecting strength of concrete
8.4.9. Form work
8.4.10. Vibrators
8.4.11. Curing
8.4.12. General introduction to Precast RC units
8.4.13. Hydration and segregation

8.5. Wood Work
8.5.1. Frame and shutters of doors and windows
8.5.2. Timber construction of upper floors
8.5.3. Design and construction of stairs (types, various terms and elements of staircase)
8.5.4. Double timber roofs
8.5.5. False ceiling
8.5.6. Sky-light: elements, functions and construction details

8.6. Steel Work
8.6.1. Steel work in windows: Standards, elements and functions
8.6.2. Tubular and angle steel roofs
8.6.3. Iron grill and lattice work

Part III Architecture

9. Building Design

9.1. Analysis of Building Elements
- 9.1.1. Bed
- 9.1.2. Kitchen/Dining
- 9.1.3. Living Hall
- 9.1.4. Class Room
- 9.1.5. Working Office Space
- 9.1.6. Library
- 9.1.7. Meeting hall

9.2. Design Consideration
- 9.2.1. Specific program: space requirements
- 9.2.2. Site: topography, orientation, environment
- 9.2.3. Functional relationship between activities
- 9.2.4. Culture: tradition, values, taste
- 9.2.5. Economics: efficient use of space and materials
- 9.2.6. Availability to technology and material
- 9.2.7. Structure type and efficiency
- 9.2.8. Optimum use of natural light and ventilation
- 9.2.9. Aesthetics

9.3. Climatology
- 9.3.1. Climate: sun, wind, rain, humidity
- 9.3.2. Orientation of the building with respect to the sun and wind: best, optimum, bad
- 9.3.3. Determination of length of roof projection to act as sunshade

10. Architectural Modelling

10.1. Modelling Materials and Practices
- 10.1.1. Use of models
- 10.1.2. Choice of materials
- 10.1.3. Modelling techniques
- 10.1.4. Accuracy of models
- 10.1.5. Determination of degree of detailing
- 10.1.6. Model construction of multi-storey buildings
- 10.1.7. Contour models of sites

10.2. Equipment Required
- 10.2.1. Choice of cutting tools
- 10.2.2. Choice of adhesives

10.2.3. Choice of colour and tone
10.2.4. Choice of paint and brushes
10.2.5. Miscellaneous tool

11. Graphics and Presentation

11.1. Principles of Composition
11.1.1. Balance
11.1.2. Scale
11.1.3. Rhythm
11.1.4. Monotony
11.1.5. Contrast
11.1.6. Unity
11.1.7. Focal point
11.2. Tone
11.2.1. Light
11.2.2. Medium
11.2.3. Dark
11.2.4. Flat
11.2.5. Graded
11.3. Free Hand Works
11.3.1. Drawing lines
11.3.2. Drawing letters
11.3.3. Three dimensional objects
11.4. Presentation
11.4.1. Textures
11.4.2. Exterior and interior objects
11.4.3. Human figures
11.4.4. Shadows
11.5. Medium for Presentation
11.5.1. Pencil techniques
11.5.2. Colour history and type: pencil colour, water colour, Poster colour
11.5.3. Primary, secondary and tertiary colours
11.5.4. Warm and cool colours
11.5.5. Properties of colour
11.5.6. Colour circle
11.5.7. Colour scheme: monochromatic, analogous, complementary and triad

11.6. Data Presentation in Graphical Forms
- 11.6.1. Translation of numerical data into diagrams and vice versa
- 11.6.2. Pie chart, bar chart and 2D graphs

11.7. Cartography
- 11.7.1. Tracing of land-use maps
- 11.7.2. Presentation of land-use maps

Part IV Miscellaneous

12. Miscellaneous

12.1. निजामती सेवा ऐन,२०४९ र नियमावली, २०५०

12.2. सार्वजनिक खरिद ऐन,२०६३ र नियमावली,२०६४

12.3. स्थानीय सरकार संचालन ऐन,२०७४

12.4. सुदूरपश्चिम प्रदेश सुशासन ऐन,२०७५