

# शंखरापुर नगरपालिका

सिभिल, बिल्डिङ एण्ड आर्किटेक्ट, सातौँ पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- १००

द्वितीय चरण :- (क) अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३५

## परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- १००

पत्र	विषय	खण्ड	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या × अङ्क	समय
प्रथम	General Subject	Part I: General Awareness & General Reasoning Test	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	२५ प्रश्न × १ अङ्क	१ घण्टा ३० मिनेट
		Part II: Technical Subject					७५ प्रश्न × १ अङ्क	

द्वितीय चरण : अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३५

पत्र / विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	समय
अन्तर्वार्ता (Interview)	३५		अन्तर्वार्ता(Interview)	-

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- 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 ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

**प्रथम पत्र (Paper I): General Subject**

**Part (I) : - General Awareness & General Ability Test**

**1. General Awareness and Contemporary Issues**

- 1.1 Physical, socio-cultural and economic geography and demography of Nepal
- 1.2 Major natural resources of Nepal
- 1.3 Geographical diversity, climatic conditions, and livelihood & lifestyle of people
- 1.4 Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
- 1.5 Current periodical plan of Nepal
- 1.6 Information on sustainable development, environment, pollution, climate change, biodiversity, science and technology
- 1.7 Nepal's international affairs and general information on the UNO, SAARC & BIMSTEC
- 1.8 The Constitution of Nepal (From Part 1 to 5 and Schedules)
- 1.9 Governance system and Government (Federal, Provincial and Local)
- 1.10 Provisions of civil service act and regulation relating to constitution of civil service, organisational structure, posts of service, fulfillment of vacancy and code of conduct
- 1.11 Functional scope of public services
- 1.12 Public Service Charter
- 1.13 Concept, objective and importance of public policy
- 1.14 Fundamentals of management : planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
- 1.15 Government planning, budgeting and accounting system
- 1.16 Major events and current affairs of national and international importance

**2. General Reasoning Test**

**2.1 Logical Reasoning**

Verbal Ability, Alphanumeric Series, Reasoning Analogies, Classification, Coding-Decoding, Order & Ranking, Distance & Directions, Analytical and Logical Reasoning, Assertion and Reason, Statement and Conclusion, Input-Output, Venn- diagram

**2.2 Numerical Reasoning**

Arithmetic Series, Analogy, Classification, Arithmetical Reasoning, Fraction, Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calender, Data Sufficiency, Data Interpretation & Data Verification

**2.3 Spatial Reasoning**

Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion, Embedded Images, Image Formation & Analysis, Mirror and Water Images, Cubes and Dices, Paper Folding & Cutting

**Part (II) : - Technical Subject**

**1. Structural Engineering**

- 1.1 Center of gravity, moment of inertia , radius of gyration
- 1.2 Stresses and strains, theory of torsion and flexure
- 1.3 Analysis of beams and frames: bending moment, shear force and deflection of beams and frames
- 1.4 Determinate structures (energy methods), three hinged systems, suspension cable system
- 1.5 Indeterminate structures:- slope deflection method and moment distribution method, use of influence line diagrams for simple beams, unit load method, two hinged arch
- 1.6 Plastic analysis of beam and frame

**2. Engineering Survey**

- 2.1 Introduction and basic principles, classification of surveys
- 2.2 Linear measurement techniques:- chain and tape method, ranging rods and arrows, representation of measurement and common scales, sources of errors, effect of slope and slope correction, correction for chain and tape measurements, abney level and clinometers
- 2.3 Compass:- types of compass, problems and sources of errors in compass survey
- 2.4 Plane table surveying: principles and methods of plane tabling
- 2.5 Leveling: principle of leveling, temporary and permanent adjustment of level, bench marks, booking methods and their recording, longitudinal and cross sectioning, reciprocal leveling, trigonometric leveling
- 2.6 Contouring: contour interval and characteristics of contours, methods of contouring, interpolation, use of contour map
- 2.7 Theodolite traversing: need of traverse and its significance, principle of traverse, computation of coordinates; adjustment of closed traverse and linked traverse, closing errors
- 2.8 Tacheometry: principle, tacheometric formula, relation of distance and elevation
- 2.9 Uses of total station and electronic distance measuring instruments
- 2.10 Curves: types and suitability, elements, geometry and setting out of curves (simple circular curve, vertical curve, transition curve )
- 2.11 Calculation of area and volume: methods of area calculation of land, methods of area and volume calculation of cut and fill, mass haul diagram

**3. Construction Materials**

- 3.1 Properties of building materials: physical, chemical, constituents, thermal
- 3.2 Stones: characteristics and requirements of stones as a building materials
- 3.3 Ceramic materials: ceramic tiles, mosaic tile, brick types and testing
- 3.4 Cementing materials: types and properties of lime and cement; cement mortar tests
- 3.5 Metals: types and properties of steel, alloys

# शंखरापुर नगरपालिका

सिभिल, बिल्डिङ एण्ड आर्किटेक्ट, सातौं पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 3.6 Timber and wood: timber trees in Nepal, types and properties of wood
- 3.7 Miscellaneous materials: asphaltic materials (asphalt, bitumen and tar), paints and varnishes, polymers
- 3.8 Soil properties and its parameters
- 3.9 Local and modern building construction material in Nepal
4. **Concrete Technology**
  - 4.1 Constituents and properties of concrete (physical and chemical)
  - 4.2 Water cement ratio
  - 4.3 Grade and strength of concrete, concrete mix design, testing of concrete
  - 4.4 Mixing, transportation pouring and curing of concrete
  - 4.5 Admixtures
  - 4.6 High strength concrete
  - 4.7 Pre-stressed concrete
5. **Geotechnical Engineering**
  - 5.1 Formation of soil, general classification of soil depending on transporting agent and deposit media
  - 5.2 Three phases of soil: basic terms, relation between basic terms, volumetric relationship: mass and volume, weight and volume, specific gravity of soil and lab test, field density and determination methods
  - 5.3 Types of water in soil, moisture content and relationship, organic content in soil
  - 5.4 Index properties of soil: grain size distribution and types of soil depending on grain size distribution, consistency limit, relative density, lab test of index properties
  - 5.5 Types of rock, dip, strike, fold, fault, cleavage, geographical divisions of Nepal, earthquake: causes of earthquake, types of wave, grading of earthquake, seismic fault line in Nepal
  - 5.6 Tunneling: types of tunnels, component parts of a tunnel and tunnel cross section, survey for tunnel alignment, drainage, lighting and ventilation requirements for tunnels, method of tunneling in soft soils and rocks
6. **Construction Management**
  - 6.1 Construction scheduling and planning: network techniques (CPM, PERT) and bar charts
  - 6.2 Contractual procedure and management: types of contract, bid and bid notice, preparation of bidding document, contractors pre-qualification, evaluation of tenders and selection of contractor, contract acceptance, condition of contract, quotation and direct purchase, classifications of contractors, dispute resolution, muster roll
  - 6.3 Material management: procurement procedures and materials handling
  - 6.4 Cost, quality and time control
  - 6.5 Project management

# शंखरापुर नगरपालिका

सिभिल, बिल्डिङ एण्ड आर्किटेक्ट, सातौं पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 6.6 Occupational health and safety
  - 6.7 Project monitoring and evaluation
  - 6.8 Quality assurance plan
  - 6.9 Variation, alteration and omissions
7. **Estimating, Costing, Specification and Valuation**
- 7.1 Types of estimates and their specific uses
  - 7.2 Methods of calculating quantities
  - 7.3 Key components of estimating norms and rate analysis
  - 7.4 Preparation of bill of quantities
  - 7.5 Purpose, types and importance of specification
  - 7.6 Purpose, principles and methods of valuation
8. **Engineering Drawing**
- 8.1 Drawing sheet composition and its essential components
  - 8.2 Suitable scales, site plans, preliminary drawings, working drawings
  - 8.3 Theory of projection drawing: perspective, orthographic and axonometric projection, first and third angle projection
  - 8.4 Drafting tools and equipments
  - 8.5 Drafting conventions and symbols
  - 8.6 Topographic, electrical, plumbing and structural drawings
  - 8.7 Techniques of free hand drawing
  - 8.8 Community buildings: School and hospital buildings and their design considerations
9. **Engineering Economics**
- 9.1 Benefit cost analysis, cost classification, sensitivity analysis, internal rate of return, time value of money; economic equilibrium, demand, supply and production, net present value, financial and economic evaluation
10. **Professional Practices**
- 10.1 Ethics, integrity and professionalism: code of conduct and guidelines for professional engineering practices
  - 10.2 Nepal Engineering Council Act, 2055; and regulations, 2056
  - 10.3 Relation with clients, contractor and fellow professionals
  - 10.4 Public procurement practices for works, goods and services and its importance
  - 10.5 National Building Code: Hierarchy of building codes and its application, procedure for implementation of building code in Nepal
  - 10.6 Building Bylaws

# शंखरापुर नगरपालिका

सिभिल, बिल्डिङ एण्ड आर्किटेक्ट, सातौँ पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

## 11. Building Materials and Construction

- 11.1 Stone masonry: Types of stone used in stone masonry, specifications of stone masonry.
- 11.2 Brick masonry: Classification of bricks, specifications of different types of bricks, testing of bricks, different shapes of bricks.
- 11.3 Hollow Concrete Blocks: Various types of concrete blocks, use of concrete blocks in buildings.
- 11.4 Sand: Requirement of good quality sand, sieve analysis, fineness modules.
- 11.5 Lime: Different types of lime and their uses test of freshness.
- 11.6 Mortar: Types of mortar, specifications, proportion of mortar for various types of masonry works.
- 11.7 Paintings: Types of paints, specification for various types of painting Works.
- 11.8 Water proofing: Water proofing at basement, ground floor and roofs, common water proofing problems in Nepal.
- 11.9 Roofing Systems: Different types of roofing system.
- 11.10 Doors and windows: Different types of doors and windows, door and window details, merits and demerits of metal door and windows.
- 11.11 Walls: Different types of wall system, Load bearing walls, partition walls and curtain walls.
- 11.12 Pre-fabrication: Principles of pre-fabrication, advantages and disadvantages of a pre-fabricated building.
- 11.13 Flooring: Different types of flooring, specification of floorings.
- 11.14 Plastering: Different types of plasters and coating materials.
- 11.15 Formworks: Shoring, underpinning, scaffolding and formworks.
- 11.16 Building Elements: Foundation, super structure, lintel, floors, roofs, sun control devices, parapet, staircase, emergency stairs, elevators and escalators
- 11.17 Building services: water supply and sanitation, electrification, heating and ventilation and air-conditioning.
- 11.18 National Building Code: Hierarchy of building codes and its application, procedure for implementation of building code in Nepal.
- 11.19 Development Control System in municipalities in Nepal
- 11.20 Maintenance and repair of buildings.
- 11.21 Principles of low cost construction techniques.
- 11.22 Current building norms for estimating and costing.

## 12. Structural Design and Analysis

- 12.1 Design of RCC footings, columns, slabs, beams..
- 12.2 Analysis of structural system in a building.
- 12.3 Design of steel structure.
- 12.4 Design of timber structure.
- 12.5 Design of masonry structure.
- 12.6 Common structural problems in RCC buildings in Nepal.
- 12.7 Requirements of earthquake resistant building construction.
- 12.8 Computer Aided Design (CAD) of building structure.
- 12.9 Mandatory Rule of Thumb in building design.
- 12.10 Non-engineered earthquake resistant building design.

# शंखरापुर नगरपालिका

सिभिल, बिल्डिङ एण्ड आर्किटेक्ट, सातौं पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

## 13. Housing and Urban Planning

- 13.1 Hierarchy of urban settlements,
- 13.2 Types of urban settlements in Nepal.
- 13.3 Base Maps:
- 13.4 Hierarchy of plans
- 13.5 Principles of land use planning
- 13.6 Building byelaws
- 13.7 Periodic plans for local authorities
- 13.8 Planning legislation of Nepal
- 13.9 Environmental issues in urban development.
- 13.10 Institutions involved in urban planning and development in Nepal.
- 13.11 Types of urban development programmes in Nepal.
- 13.12 Conservation of heritage sites,
- 13.13 Settlement planning for disaster mitigation.
- 13.14 Municipalities of Nepal and their role in urban development.
- 13.15 Town Development Committees and their role in urban development.
- 13.16 Different types of housing,
- 13.17 Principles of housing design,
- 13.18 Different models of land development,
- 13.19 Squatter and slums,
- 13.20 Private housing development,
- 13.21 Rural housing, housing development programmes in Nepal,
- 13.22 Prospects of apartments and group housing in Nepal.

## 14. Architecture

- 14.1 History of architecture
- 14.2 Contemporary world architecture
- 14.3 Contemporary Nepalese architecture
- 14.4 Traditional architecture of Nepal
- 14.5 Architecture of Kathmandu Valley
- 14.6 Principles of architectural design.
- 14.7 Factors to be considered while designing buildings.
- 14.8 Standards to be followed while designing buildings in Nepal
- 14.9 Contemporary world architects and their works
- 14.10 Architectural landmarks in Nepal
- 14.11 Conservation of historic buildings.
- 14.12 Ethics of architects in professional practice.