

**पदपूर्ती समिति**  
**चापाकोट नगरपालिकाको कार्यालय**  
**स्याङ्जा**

सिभिल इन्जिनियर, अधिकृत स्तर छैटौं तहको खुल्ला प्रतियोगितात्मक लिखित परीक्षाको

**पाठ्यक्रमको रूपरेखा**

प्रथम चरण :- लिखित परीक्षा  
द्वितीय चरण :- अन्तरवार्ता

पूर्णाङ्क :- २००  
पूर्णाङ्क :- ३०

पथम चरण – लिखित परीक्षा याजना

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न सख्या X अङ्कभार	समय
प्रथम	सिभिल इन्जिनियरिङ्ग सम्बन्धी विषय	१००	४०	वस्तगत बहुउत्तर (Multiple Choice)	१००X१ = १००	१ घण्टा १५ मिनेट
द्वितीय	सेवा तथा स्थानीय शासन सम्बन्धी	१००	४०	विषयगत (Subjective)	<u>Section A [२५]</u> १ x ५=५, २x१०=२० <u>Section B [२५]</u> १ x ५=५, २x१०=२० <u>Section C [३०]</u> २x५=१०, २x१०=२० <u>Section D [२०]</u> २x१०=२०	३ घण्टा

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तरवार्ता	३०	मौखिक

## प्रथम पत्र : सिभिल इञ्जिनियरिङ्ग सम्बन्धी विषय

- 1. Structure Analysis and Design** **20**
  - 1.1 Stresses and strains; theory of torsion and flexure; moment of inertia
  - 1.2 Analysis of beams and frames: Bending moment, shear force and deflection of beams and frames: determinate structure - Energy methods; three hinged systems, indeterminate structures-slope deflection method and moment distribution method; use of influence line diagrams for simple beams, unit load method
  - 1.3 Reinforced concrete structures: Difference between working stress and limit state philosophy, analysis of RC beams and slabs in bending, shear, deflection, bond and end anchorage, Design of axially loaded columns; isolated and combined footings, introduction to pre-stressed concrete
  - 1.4 Steel and timber structures: Standard and built-up sections: Design of riveted, bolted and welded connections, design of simple elements such as ties, struts, axially loaded and eccentric columns, column bases, Design principles on timber beams and columns
- 2. Construction Materials** **15**
  - 2.1 Properties of building materials: physical, chemical, constituents, thermal etc.
  - 2.2 Stones-characteristics and requirements of stones as a building materials
  - 2.3 Ceramic materials: ceramic tiles, Mosaic Tile, brick types and testing etc.
  - 2.4 Cementing materials: types and properties of lime and cement; cement mortar tests
  - 2.5 Metals: Steel; types and properties; Alloys
  - 2.6 Timber and wood: timber trees in Nepal, types and properties of wood
  - 2.7 Miscellaneous materials: Asphaltic materials (Asphalt, Bitumen and Tar); paints and varnishes; polymers
  - 2.8 Soil properties and its parameters
- 3. Concrete Technology** **12**
  - 3.1 Constituents and properties of concrete (physical and chemical)
  - 3.2 Water cement ratio
  - 3.3 Grade and strength of concrete, concrete mix design, testing of concrete
  - 3.4 Mixing, transportation pouring and curing of concrete
  - 3.5 Admixtures
  - 3.6 High strength concrete
  - 3.7 Pre-stressed concrete technology
- 4. Construction Management** **12**
  - 4.1 Construction scheduling and planning: network techniques (CPM, PERT) and bar charts
  - 4.2 Contractual procedure and management: types of contract, tender and tender notice, preparation of bidding (tender) document, contractors pre-qualification, evaluation of tenders and selection of contractor, contract acceptance, condition of contract; quotation and direct order, classifications of contractors; dispute resolution; muster roll
  - 4.3 Material management: procurement procedures and materials handling
  - 4.4 Cost control and quality control
  - 4.5 Project maintenance
  - 4.6 Occupational health and safety
  - 4.7 Project monitoring and evaluation
  - 4.8 Quality assurance plan

4.9	Variation, alteration and omissions	
<b>5.</b>	<b>Estimating and Costing Valuation and Specification</b>	<b>10</b>
5.1	Types of estimates and their specific uses	
5.2	Methods of calculating quantities	
5.3	Key components of estimating norms and rate analysis	
5.4	Preparation of bill of quantities	
5.5	Purpose, types and importance of specification	
5.6	Purpose, principles and methods of valuation	
<b>6.</b>	<b>Drawing Techniques</b>	<b>10</b>
6.1	Drawing sheet composition and its essential components	
6.2	Suitable scales, site plans, preliminary drawings, working drawings etc	
6.3	Theory of projection drawing: perspective, orthographic and axonometric projection; first and third angle projection	
6.4	Drafting tools and equipments	
6.5	Drafting conventions and symbols	
6.6	Topographic, electrical, plumbing and structural drawings	
6.7	Techniques of free hand drawing	
<b>7.</b>	<b>Engineering Survey</b>	<b>8</b>
7.1	Introduction and basic principles	
7.2	Linear measurements: techniques; chain, tape, 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	
7.3	Compass and plane table surveying: bearings; types of compass; problems and sources of errors of compass survey; principles and methods of plane tabling	
7.4	Leveling and contouring: Principle of leveling; temporary and permanent adjustment of level; bench marks; booking methods and their reductions; longitudinal and cross sectioning; reciprocal leveling; trigonometric leveling; contour interval and characteristics of contours; methods of contouring	
7.5	Theodolite traversing: need of traverse and its significance; computation of coordinates; adjustment of closed traverse; closing errors	
7.6	Uses of Total Station and Electronic Distance Measuring Instruments	
<b>8.</b>	<b>Engineering Economics</b>	<b>8</b>
8.1	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	
<b>9.</b>	<b>Professional Practices</b>	<b>5</b>
9.1	Ethics and professionalism: code of conduct and guidelines for professional engineering practices	
9.2	Nepal Engineering Council Act, 2055 and regulations, 2056	
9.3	Relation with clients, contractor and fellow professionals	
9.4	Public procurement practices for works, goods and services and its importance	

द्वितीय पत्र :- सेवा सम्बन्धी

**Section A – 25 Marks**

- 1. Transportation and Trail Bridge. 15**
- 1.1. Transportation system and its classification.
  - 1.2. Transportation planning: rationale, types and its philosophy.
  - 1.3. Road transport and road construction in Nepal.
  - 1.4. Classification of roads in Nepal (NRS and IRC)
  - 1.5. General principles of road network planning.
  - 1.6. Feasibility study of road projects.
  - 1.7. Alignment, engineering survey and its stages.
  - 1.8. Geometric design of roads: map study, element of cross-section and highway alignment, design of horizontal curve, super elevation, transition curve, vertical curves, right of way.
  - 1.9. Drainage consideration in roads.
  - 1.10. Special consideration in Hill roads design.
  - 1.11. Road Pavement: Types of pavement and their applicability in hill roads, Design of pavement,
  - 1.12. Bioengineering practices along hill side
  - 1.13. Activities and techniques in road construction in rural roads
  - 1.14. Maintenance, repair and rehabilitation of roads.
  - 1.15. Basic knowledge on design, construction and maintenance of suspended and suspension bridge in Nepal.
  - 1.16. Role of social mobilization in rural road development.
  - 1.17. Low-cost road construction
- 2. Water Supply and Sanitation. 10**
- 2.1 Rural and community based water supply system.
  - 2.2 Water supply sources and their management.
  - 2.3 Selection of source.
  - 2.4 Water quality and treatment, water demand and supply, source protection
  - 2.5 Intakes, collection chamber and break pressure tanks.
  - 2.6 Reservoir and distribution system.
  - 2.7 Intakes, Pipeline design, design of transmission and distribution system, reservoir design.
  - 2.8 Pipe and fittings: Pipe materials, pipe laying and fittings.
  - 2.9 Operation and maintenance of water supply systems
  - 2.10 Sanitation, wastewater and solid waste management:
    - 2.10.1 On-site sanitation system
    - 2.10.2 Types of sewerage system, design and construction of sewers.
    - 2.10.3 Types, characteristics, sources, quantity, generation, collection, transportation and disposal of solid wastes.
    - 2.10.4 Sanitary landfill, incineration, composting etc.
  - 2.11 Environmental health engineering- Epidemiology, pathogens (Bacteria, Virus, Helminthes, Protozoa)

## **Section B – 25 Marks**

- 3. Energy System** **5**
- 3.1 Hydrological study, planning and design of small hydropower projects.
  - 3.2 Head works, dams, spillways, surge tanks, stilling basin etc.
  - 3.3 River diversion works.
  - 3.4 Biogas- Introduction.
  - 3.5 Alternative energy systems in Nepal
- 4. Irrigation and River training works.** **10**
- 4.1 Status of irrigation development in Nepal.
  - 4.2 Methods of irrigation and their suitability.
  - 4.3 Design of irrigation canals.
  - 4.4 Operation and maintenance of irrigation systems
  - 4.5 Management of Farmers managed irrigation system.
  - 4.6 Preventive and remedial measures of water logging.
  - 4.7 Flood control, its necessity and flood mitigation measures.
  - 4.8 River training works.
  - 4.9 Specific considerations in design, operation and management of hill irrigation systems
- 5. Housing, building and urban planning.** **5**
- 5.1 Present status and practices of building construction in Nepal
  - 5.2 Specific considerations in design and construction of buildings in Nepal
  - 5.3 Indigenous technology in building design and construction
  - 5.4 Local and Modern building construction material in Nepal
  - 5.5 Community buildings: School and hospital buildings and their design considerations
  - 5.6 Urban planning needs and challenges in Nepal.
- 6. Technology, Environment and civil society.** **5**
- 6.1 Technological development in Nepal.
  - 6.2 Promotion of local technology and its adaptation
  - 6.3 Environmental Impact Assessment, Initial Environmental Examination, Global-warming phenomena.
  - 6.4 Types of sources of pollution: point / non-point ( for air and water)
  - 6.5 Social mobilization in local infrastructure development and utilization in Nepal.
  - 6.6 Participatory approach in planning, implementation, maintenance and operation of local infrastructure

## Section C – 30 Marks

विकेन्द्रिकरण र स्थानीय शासन

(२ प्रश्न x ५ अंक = १० र २ प्रश्न x १० अंक = २०)

- विकेन्द्रिकरणका अवधारणा, सिद्धान्त, उद्देश्य र सान्दर्भिकता
- विकेन्द्रिकरणका स्वरूप र तरिकाहरु
- नेपालमा विकेन्द्रिकरण र स्वायत्त शासनका लागि भएका प्रयासहरु, स्थानीय सरकारका आवश्यकता र महत्व
- स्थानीय स्वायत्त शासनका अवधारणा, सिद्धान्त र आवश्यकता
- संघीय शासन प्रणाली
- वित्तीय विकेन्द्रिकरण र वित्तीय स्वायत्तता
- नेपालमा स्थानीय निकायका वित्तीय अधिकार अवस्था र समस्या
- स्थानीय स्वायत्त शासन ऐन २०५५ का विशेषता, व्यवस्था र स्थानीय निकायका कार्यहरु,
- नेपालमा विकेन्द्रिकरण र स्थानीय स्वायत्त शासनका सन्दर्भमा देखिएका समस्या र संभावनाहरु
- नेपालमा विषयगत निक्षेपणका प्रयास र उपलब्धी
- स्थानीय विकासमा जिल्ला विकास समिति र नगरपालिकाको सम्बन्ध ।
- स्थानीय निकायका कर व्यवस्था

## Section D – 20 Marks

ग्रामिण तथा शहरी विकास

(२ प्रश्न x १० = २०)

- नेपालमा ग्रामीण तथा शहरी विकासका लागि २००८ साल देखि हालसम्म भएका प्रयास, समस्या र सम्भावनाहरु
- ग्रामीण तथा शहरी विकास योजना तर्जुमा, कार्यान्वयन, अनुगमन र मूल्याङ्कन
- स्थानीय श्रोत परिचालन तथा व्यवस्थापन
- ग्रामीण र शहरी विकास वीचका सम्बन्ध र साभेदारी (Rural-urban Linkage/Partnership)
- शहरीकरण र शहरी सेवाका व्यवस्थापन
- जन सहभागिताका सैद्धान्तिक अवधारणा र स्थानीय विकासमा जनसहभागिता
- शहरी शासनसम्बद्ध संस्थाहरु (सरकारी निकायहरु, स्थानीय निकायहरु, दातृसंस्था, गै.स.स., नागरिक समाज आदि) का भूमिका तथा जिम्मेवारी ।
- शहरी शासनसम्बद्ध मुद्दाहरु : पूर्वाधार सेवा, वित्तीय व्यवस्था, वातावरण व्यवस्थापन ।
- शहरी पूर्वाधार सेवा तथा शहरी आधारभूत सेवामा सार्वजनिक निजी साभेदारी अवधारणा ।
- शहरी सार्वजनिक प्रशासनमा सूचना प्रविधिको प्रयोग ।
- जनसंख्या व्यवस्थापन, बसाइ सराई, आप्रवास, सुकुम्बासी व्यवस्थापन ।
- वस्ती विकास, शहरी योजना तथा भवन निर्माण मापदण्ड, २०७२