मेलम्ची नगरपालिका

नेपाल इञ्जिनियरिङ्ग सेवा, सिभिल समूह, अधिकृत छैटा तह, सिभिल इञ्जिनियर पदको खुला र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठयक्रम एवं परीक्षा प्रणाली (योजना)

पाठयक्रमका रुपरेखा :- यस पाठयक्रमका आधारमा निम्नानुसार दुई चरणमा परीक्षा लिइने छ :

प्रथम चरण :- लिखित परीक्षा — पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता — पूर्णाङ्क :- ३०

१. प्रथम चरण: - लिखित परीक्षा योजना **(Written Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या ह अङ्क	समय
प्रथम	सिभिल इञ्जिनियरिङ्ग सम्बन्धी विषय	**100**	**40**	वस्तुगत बहुवैकल्पिक प्रश्न **(MCQ)**	१०० प्रश्न ह १ अङ्क	१ घण्टा १५ मिनेट
द्वितीय	जनरल सम्बन्धी विषय	**100**	**40**	विषयगत	१० प्रश्न ह १० अङ्क	३ घण्टा

२. द्वितीय चरण: - अन्तर्वार्ता **(Interview)**

विषय	पणाङ्क	परीक्षा पणाली
अन्तर्वार्ता **(Interview)**	**30**	मौखिक **(Oral)**

द्रष्टव्य :

१. यो पाठयक्रम रुपरेखालाइ प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएका छ ।

२. लिखित परीक्षाका माध्यम भाषा अंग्रेजी वा नेपाली अथवा अंग्रेजी र नेपाली दुवै हुन सक्नेछ ।

३. प्रथम र द्वितीय पत्रका विषयवस्त फरक फरक हुनेछ तथा प्रथम र द्वितीय पत्रका लिखित परीक्षा छुट्टाछुट्टै हुनेछ।

४. प्रथम पत्रका एकाईहरुको प्रश्नसंख्या यथासम्भव निम्नानुसार हुनेछ। द्वितीय पत्रका पाठयक्रमका एकाईहरुबाट सोधिने पश्नहरुको संख्या द्वितीयपत्रका पाठयक्रम उल्लेख भए अनुसार हुनछ।

प्रथम पत्रका एकाइ	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
प्रश्न संख्या	**20**	**15**	**15**	**12**	**10**	**8**	**10**	**5**	**5**

५. वस्तुगत बहुवैकल्पिक **(Multiple Choice)** प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइन छैन र अङ्क कट्टा पनिगरिन छैन ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर **(Calculator)** प्रयोग गन पाइने छैन ।

७. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुका हकमा १० अङ्कका एउटा लामो प्रश्न वा एउट प्रश्नका दुई वा दुई भन्दा बढी भाग **-Two or more parts of a single question**) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु **-Short notes_** सोध्न सकिने छ ।

८. यस पाठयक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जसुकै लेखिएका भए तापनि पाठयक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाका मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठक्रममा परेका सम्झन पर्दछ ।

९. प्रथम चरणका परीक्षाबाट छनौट भएका उम्मेदवारहरुलाइ मात्र द्वितीय चरणका परीक्षामा सम्मिलित गराइनेछ ।

१०. पाठयक्रम लाग मिति :–

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छैटा तह (अधिकृत वा सो सरह) को

लिखित परीक्षाको पाठयक्रमका ढाँचा

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

1.5 Seismic Design Requirements, Regular and Irregular Configurations, Basic Assumptions, Design earthquake Loads, Basic load Combinations, Permissible Stresses, Methods of Analysis, Torsion, Soft and Weak Storeys in Construction, Overturning Moment, Non-structural elements Design Requirements, Ductile Detailing of Reinforced Concrete Elements.

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 15%

3.1 Constituents and properties of concrete (physical and chemical)

3.2 Strength of concrete - Water cement ratio, high strength concrete

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 and construction chemicals

3.6 Special concrete and concreting methods

3.7 Elasticity, creep and shrinkage

3.8 Durability of 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

5. Estimating and Costing Valuation and Specification 10%

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

6. Drawing Techniques 8%

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

7. Engineering Survey 10%

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

8. Engineering Economics 5%

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

9. Professional Practices 5%

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
9.5 Local Self governance act 2055 and regulation 2056.
9.6 Town Development, Urban Planning and Building-Related Basic Guidance, 2072
9.7 Nepal National Building Codes (NBC)

मेलम्ची नगरपालिका

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छठा तह (अधिकृत वा सो सरह) को

लिखित परीक्षाको पाठयक्रमका ढाँचा

द्वितीय पत्र - जनरल सम्बन्धी विषय

Section A – 30 Marks

1. Transportation and Trail Bridge. 30 %

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:
  1.9.1. Introduction and design of culverts and minor bridges, cross drainage structures, subsurface drainage system.
1.10. Special consideration in Hill roads design:
  1.10.1. Problems associated with hill roads construction
  1.10.2. Route location, hairpin bends and special structures.
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

Section B – 30 Marks

2. Water Supply and Sanitation. 20%

2.1 Rural and community based water supply system.
2.2 Water supply sources and their management.
  2.2.1 Surface water
  2.2.2 Ground water
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, separation at source, collection, transportation and disposal of solid wastes.
2.10.4 Sanitary landfill, incineration, composting etc.
2.10.5 Integrated solid waste management.
2.10.7 Solid Waste Management Practices in Kathmandu Valley
2.11 Environmental health engineering- Epidemiology, pathogens (Bacteria, Virus, Helminthes, Protozoa)

Section C – 20 Marks

3. Energy System 10%

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 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

Section D – 20 Marks

5. Housing, building construction and urban planning. 10%

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.
5.7 National Building Code: Hierarchy of building codes and application, procedure for implementation of building code in Nepal.
5.8 Development Control System in municipalities in Nepal
5.9 Maintenance and repair of buildings.
5.10 Principles of low cost construction techniques.
5.11 Current building norms for estimating and costing.

6. Technology, Environment and civil society. 10%

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

द्वितीय पत्रको एकाईहरुको प्रश्नसंख्या निम्नानुसार हुनेछ

द्वितीय पत्रका खण्ड	A	B	C	D
द्वितीय पत्रका एकाइ	1	2	3	4
प्रश्न संख्या	3	2	3	2