

कमलामाई नगरपालिका
नगर कार्यपालिकाको कार्यालय
सिन्धुलीमाढी, सिन्धुली
बागमती प्रदेश, नेपाल



स्थानिय तह अन्तर्गतको इन्जिनियरिङ सेवा, सिभिल समूह, अधिकृत सातौं तह, सिभिल इन्जिनियर पदको खुला
प्रतियोगितात्मक परीक्षाको पाठ्यक्रम, २०८१

भाग १

Document Review (कागजात परीक्षण: १. ठेगाना, २. अनुभव, ३. शैक्षिक योग्यता)

पूर्णाङ्क:-२५

भाग २

लिखित परीक्षा (Written Examination):

प्रथम पत्र

पूर्णाङ्क:-१००

द्वितीय पत्र

पूर्णाङ्क:-१००

भाग ३

अन्तिम चरण (final Examination)

: अन्तर्वार्ता

पूर्णाङ्क: ३०

परीक्षा योजना (Examination Scheme)

१. लिखित परीक्षा (Written Examination)

पूर्णाङ्क: २००

पत्र	विषय	खण्ड	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या * अङ्क	समय
प्रथम पत्र	सामान्य ज्ञान तथा सामान्य क्षमता परीक्षण		१००	४०	बस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQS) १०० प्रश्न*१ अंक	१ घण्टा ३० मिनेट
द्वितीय पत्र	जनरल इन्जिनियरिङ		१००	४०	बस्तुगत (objective)	बहुवैकल्पिक प्रश्न (MCQS) १०० प्रश्न*१ अंक	१ घण्टा ३० मिनेट

२. अन्तर्वार्ता (Interview)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता (Interview)	३०	मौखिक (Oral)

द्रष्टव्य :

- यो पाठ्यक्रम योजनालाई लिखित परीक्षा(प्रथम चरण र द्वितीय चरण) तथा अन्तिम चरण(अन्तर्वार्ता) गरी दुई भागमा विभाजन गरिएको छ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अङ्ग्रेजी दुवै अथवा नेपाली वा अङ्ग्रेजी दुवै हुनेछ ।
- परीक्षामा कुनै प्रकारको क्यालकुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- नगरपालिकाबाट संचालन हुने परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- कागजात परीक्षण लिखित परीक्षा र अन्तिम चरणको अन्तर्वार्ताको कूल अंक योगका आधारमा अन्तिम परीक्षाफल प्रकाशित गरिनेछ ।

विनायक शर्मा
प्रमुख प्रशासकीय अधिकारी

स्थानिय तह अन्तर्गतको इन्जिनियरिङ सेवा सिभिल समूह अधिष्ठित सातौं तह सिभिल इन्जिनियर पदको खुला
प्रतियोगितात्मक परीक्षाका पाठ्यक्रम २०८१



प्रथम पत्र (Paper I): General Subject
Part (I):- General Awareness & General Ability Test (100 marks)

1. Constitution of Nepal and relevant laws:

- १.१ नेपालको संविधान
- १.२ कर्मचारी समायोजन ऐन, २०७५
- १.३ सार्वजनिक खरिद ऐन, २०६३ र नियमावली, २०६४
- १.४ भ्रष्टाचार निवारण ऐन, २०५९
- १.५ सम्पत्ति शुद्धीकरण (मनी लाउन्डरिङ्ग) निवारण ऐन, २०६४
- १.६ सुशासन (व्यवस्थापन तथा संचालन) ऐन २०६४
- १.७ सूचनाको हक सम्बन्धी ऐन, २०६४ र नियामवली, २०६५
- १.८ संघीय तथा प्रादेशिक निजामती ऐन तथा नियमावली
- १.९ नेपाल राष्ट्रिय भवन संहिता, २०७७
- १.१० आर्थिक कार्यविधि तथा वित्तिय उत्तरदायित्व ऐन २०७६, नियमावली, २०७७
- १.११ ढुङ्गा, गिट्टी तथा बालुवा उत्खनन, बिक्री तथा व्यवस्थापन सम्बन्धी मापदण्ड, २०७७

2. General Awareness and Contemporary Issues

- २.१ नेपालको भौगोलिक, सामाजिक, सांस्कृतिक र आर्थिक अवस्था
- २.२ नेपालका प्रमुख प्राकृतिक सम्पदाहरू
- २.३ भौगोलिक विविधता, हावापानीको अवस्था र नेपाली जनजीवन
- २.४ नेपालको राजनीतिक, सामाजिक र आर्थिक इतिहास
- २.५ नेपालको चालु पञ्च वर्षिय योजना
- २.६ दिगो विकासका लक्ष्यहरू
- २.७ वातवरण, प्रदुपण, जलवायु परिवर्तन र जैविक विविधता
- २.८ विज्ञान तथा प्रविधि
- २.९ UNO र SAARC सम्बन्धी सामान्य जानकारी
- २.१० नेपालको शासकीय प्रणाली तथा संघीय, प्रादेशिक र स्थानीय सरकार
- २.११ सार्वजनिक सेवाको अवधारणा, विशेषता र क्षेत्र
- २.१२ नगरिक वडापत्र
- २.१३ सार्वजनिक नीतिको अवधारणा, उद्देश्य र महत्व
- २.१४ व्यवस्थापनको अवधारणा :- योजना, संगठन, निर्देशन, नियन्त्रण, समन्वय, निर्णय, उत्प्रेरणा र नेतृत्व
- २.१५ सार्वजनिक क्षेत्रमा योजना, बजेट निर्माण र लेखापालन
- २.१६ नेपाली कला र साहित्य
- २.१७ नेपालका राष्ट्रिय विभूतिहरू
- २.१९ विद्य सम्पदा सूचीमा नेपाल


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Paper II: Technical Subject (100 Marks)



1. Structural Engineering

- 1.1 Reinforced concrete structures: difference between working stress and limit state philosophy, design of beam and slab, 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
- 1.2 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 of timber beams and columns
- 1.3 Requirements of earthquake resistant building construction
- 1.4 Mandatory rule of thumb in building design
- 1.5 Structural design of bridge: various types of bridges, selection and type of bridges and economic span length, types of loads, forces and stresses, live load, impact load, wind load, longitudinal forces, lateral loads, centrifugal force, width of roadway and footway, general design requirements, solid slab bridges, deck girder bridges, B.M. in slab supported on four edges, distribution of live loads on longitudinal beams, method of distribution coefficients, Courbon's method, design of a T-beam bridge, balanced cantilever bridge, design of box culvert

2. Geotechnical Engineering

2.1 Soil Mechanics

2.1.1 Identification and classification of soils

Field identification of soils and soil classification: descriptive, textural, ISI, MIT and USCS

2.1.2 Permeability of soils

Factors affecting permeability of soil, determination of coefficient of permeability: laboratory and field methods

2.1.3 Effective stress

Factors affecting effective stress, capillary rise, quick sand condition

2.1.4 Seepage analysis

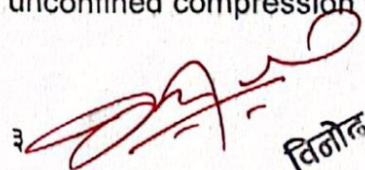
Flow net, application of flow net, seepage below concrete dam, sheet pile and safety check, seepage analysis through earthen dam and filter layer design, techniques to reduce discharge and to increase safety of dam

2.1.5 Compaction of soil

Concept of compaction, lab test, factors affecting compaction, specification of compaction, field control of compaction, methods of compaction in field and their suitability, special parameters to be considered for compaction in road, earthen dam

2.1.6 Shear strength of soils

Concept of shear strength, principal planes and principal stresses, Mohr-Coulomb theory of shear strength, calculation of normal stress and shear Stress at different plane, relation of principle stress at failure condition, types of shear tests: direct shear test, unconfined compression test, triaxial test, vane shear test


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2.1.7 Consolidation and settlements

Concept of consolidation, types of consolidation, cost of consolidation, NC, OC, OCR, preconsolidation pressure, calculation of settlement, settlement of structures resting on soil: its nature, causes and remedial measures

2.1.8 Stability of slopes

Causes of slope failures, types of slope and slope failures, critical surfaces and factor of safety, method of stability analysis and stability number, bio engineering: advantages, principles, concept, components and uses in stabilization of slope

2.2 Foundation Engineering

2.2.1 Introduction

Types of foundation, factors affecting on selection of foundation, requirement and criteria of ideal foundation, types of load for design of foundation, criteria for selection of depth of foundation

2.2.2 Earth pressure and retaining structures

Rankine's earth pressure theory, Coloumb's earth pressure theory, trial wedge theory, types of earth pressure, types of retaining wall, stability analysis of earth retaining structures, techniques to increase stability of retaining wall

2.2.3 Bearing capacity and settlements

Types of bearing capacity and factors influencing bearing capacity, effects of various factors on bearing capacity, modes of foundation failure, Terzaghi's general bearing capacity theory, ultimate bearing capacity of cohesion less and cohesive soils, settlement: types, nature and effects

2.2.4 Types of foundation and their suitability in context of Nepal

Condition to use spread or strap or combined footing; mat: types, bearing capacity, construction approach, floating mat, compensating mat; pile: types, load carrying capacity, negative skin friction (NSF) and calculation; comparison between pile, pier, and caisson; caisson: types, bearing capacity, construction of well, tilt and shift of well and its retrofication and prevention

2.2.5 Design of foundation

Design of spread foundation, combined footing, strap footing, mat foundation, pile foundation, well foundation

2.2.6 Foundation stabilization, underpinning and geotechnical process

Soil stabilization, stone column, sand pile, dynamic deep compaction, grouting and its methods, methods of underpinning, methods of dewatering.

2.3 Site Investigation and Soil Exploration

2.3.1 Purpose of site investigation, planning of investigation, stages of investigation, and methods of boring, types of soil samples

2.3.2 In-situ test: standard penetration test, dynamic cone penetration test, correction of N value, calculation of bearing capacity using N value for isolated footing, mat, pile and well, plate load test, pile load test

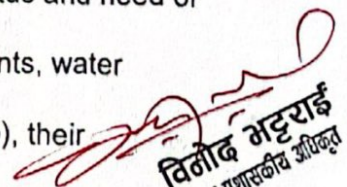
2.3.3 Preparation of site investigation report

3. Irrigation

3.1 Function, advantages and disadvantages of irrigation; status and need of irrigation in Nepal

3.2 Crops and soils, crop water and irrigation water requirements, water availability for irrigation

3.3 Irrigation methods (surface, sub-surface, sprinkler and drip), their


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- suitability, advantages and disadvantages
- 3.4 Canal types, network and alignment, canal losses, command area, delta
 - 3.5 Silt theories, design of earthen and lined canals, canal standards, specific considerations for hill irrigation
 - 3.6 Design of irrigation structures on permeable foundation (seepage theories, piping & uplift)
 - 3.7 Design of weir and barrage (crest, length and thickness of impervious floor)
 - 3.8 Design of silt control structures (excluder, ejector and settling basin)
 - 3.9 Design of energy dissipaters (hydraulic jump and stilling basins)
 - 3.10 Design of river training works (guide bund, levees and spurs), water shed management
 - 3.11 Design of regulators, drops, cross-drainage and outlets
 - 3.12 Waterlogging (causes, effects and measures), design of surface and subsurface drainage
 - 3.13 Planning and Management of Irrigation System

4. Transportation Engineering

4.1 Highway engineering

4.1.1 Highway Planning and Survey

Approach to road planning: establishing economic and environmental viability, evaluating alternatives, historical development of road construction in Nepal, classification of roads, national road network of Nepal, road survey and quantity calculation, process of identifying best route location, map study and reconnaissance survey, preliminary and detail survey, recommendation for best alignment, highway alignment and controlling factors, Asian Highway in Nepal and NRS-2045, NRS 2070

4.1.2 Geometric Design of Highway

Basic design control and criteria: design speed, vehicle characteristics, traffic volume & its composition, topography, elements of highway cross section, highway curves: tangents, type of curves, transition curves, reverse curves and their functions, circular curves, super elevation, stopping sight distance, vertical curves, gradients, average gradients and ruling gradient, Crest curve and sag curves, design considerations of horizontal and vertical alignment, extra widening, set back distance

4.1.3 Evaluation of subgrade soil

Function of subgrade soil, CBR and its test, group index, plate load test, determination of modulus of subgrade reaction (k), dynamic penetration test and its application

4.1.4 Hill Roads

Hill road design: speed, sight distance, geological conditions and alignment selection criteria, gradient selection, Hair Pin Bends, horizontal curves, passing lane in hill roads, retaining and slope protection structures in hill roads, use of bio-engineering, drainage structures, stability of formation width and cut and fill slopes

4.1.5 Highway Drainage

Importance of highway drainage: surface drainage and estimation of water quantity, design of drainage structures, erosion control and dissipating structures, subsurface drainage, cross drainage structures and types

4.1.6 Highway Materials

Binding materials, types of aggregate and tests on their gradation, strength, durability, mathematical and graphical method of aggregate gradation, binding materials, bitumen, road tar, penetration test,

consistency tests, flash point test, composition tests, bituminous mixes and asphalt concrete, open and dense graded mixes, design of asphalt mixes

4.1.7 Traffic Engineering

Traffic engineering and scope, interrelationships between human/machinery/environmental elements, impact of human and vehicular characteristics on traffic planning, traffic operations and regulations driver and vehicle control, traffic control devices, traffic flow counts and speed studies, traffic flow characteristics traffic count and presentation, O and D studies, parking studies and accident study and analysis, basic requirements of intersections, types of intersections and configuration, channelized and unchannelized intersections, design of intersections, traffic signs, signals, road marking, road delineation, road lighting, factors influencing night visibility, design of the lighting system, traffic projection and forecasting

4.1.8 Road Pavement

Types of road pavements, flexible and rigid pavement, loads and other factors controlling pavement, design methods for flexible pavements, design methods for rigid pavements, stress due to load, temperature and sub-grade friction, functions of pavement structure, axle load, damaging factor of axle loads, different types of pavement surface

4.1.9 Road Construction Technology

Activities and techniques used in road construction, tools, equipment and plants used in road construction, preparation of road subgrade, excavation, filling, compaction, moisture density relationship, field compaction control, soil stabilization, Construction of asphalt concrete layers including prime coat, tack coat, and seal coat, construction procedure of penetration macadam, construction procedure of bituminous bound macadam, construction procedure of plain cement concrete pavements

4.1.10 Highway Maintenance, Repair and Rehabilitation

Classification of maintenance activities for on road and off road structures, inspection, prioritization and planning of maintenance operations, evaluation of pavement distress and pavement condition, types and methods of pavement repair, regular, recurrent, periodic maintenance, types of overlay and strengthening of existing pavements

5. Public Health Engineering

5.1 Water Supply

5.1.1 Introduction

Potable, contaminated and wholesome water, typical components of water supply schemes

5.1.2 Sources of water

Surface source, ground water occurrences and prospecting, chemical characteristics and properties of ground water, recharge of ground water, ground water recovery, tube well design, selection of water sources

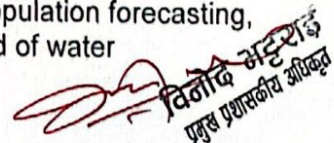
5.1.3 Quality of water

Types and sources of water pollution, effects of pollution (river, lake and reservoir), pollution of ground water, hardness of water, alkalinity in water, living organism in water, water borne diseases, physical, chemical and biological test of water, water quality standard: WHO standard of drinking water quality, Nepal interim standard of drinking water

5.1.4 Quantity of water

Types of water demand, design period, methods of population forecasting, variation in demand of water, factors affecting demand of water

5.1.5 Intake works


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Site selection of an intake, Characteristics of river reservoir and spring intake, various types of hand pumps including suction hand pump, submersible hand pumps



5.1.6 Water treatment

Treatment systems: screening, plain sedimentation, sedimentation with coagulation, flocculation, filtration (Slow sand filtration /Rapid filtration), disinfection, softening, and miscellaneous treatments (aeration, removal of iron and manganese, removal of arsenic and removal of colour, odour and taste)

5.1.7 Reservoirs and distribution systems

Types of reservoirs, sizing of reservoirs: mass curve method, peak demand method etc. for reservoir Design, Water supply system: pumping system, gravity system, Layout of the water supply system, Pipeline design: design criteria, design of transmission and distribution system (including pipe net works)

5.1.8 Operation and maintenance of water supply system

Difference between maintenance and rehabilitation, Operation of water supply system, Maintenance equipment's: wrench

5.1.9 Design specific of gravity flow rural water supply system in Nepal

5.2 Sanitary Engineering

5.2.1 Introduction

Importance of waste water and solid waste management, Sanitation system, Types of sewerage systems

5.2.2 Quantity of wastewater

Sources and nature of wastewater, effluent characteristics, Factors affecting sanitary sewage, Determination of quantity of sanitary sewage, Determination of quantity of storm water

5.2.3 Characteristics and examination of sewage

5.2.4 Sampling of sewage, Physical, chemical and biological characteristics of sewage, Decomposition of sewage, aerobic and anaerobic decomposition, Biochemical oxidation demand (BOD) and chemical oxidation demand (COD), Test of solids, Dissolved oxygen (DO), pH-value, BOD, COD, chlorine demand

5.2.5 Design and construction of sewers

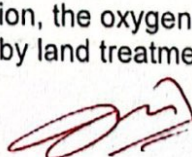
Typical design periods, flow velocity, self cleaning velocity, flow diagrams, hydraulic formulae and gradients, Estimation of quantity of sanitary sewage, collection systems, sewer design criteria, shape of sewers, types of sewers, sewer materials: requirements, salt glazed stoneware, and plain or reinforced cement concrete pipes, plastic, steel, brick, sanitary and storm water sewers for separate and combined sewer systems, construction of sewer: excavation, laying, jointing of sewer, testing of sewer, water test and air test

5.2.6 Sewage treatment

Treatment methods, Secondary treatment processes and their types, BOD removal, design criteria, activated sludge, oxidation ponds and ditches, aerated lagoons and lagoons, Sewage filtration, intermittent sand filter, contact bed, trickling filters, bio- filters and design of trickling and bio- filters

5.2.7 Sewage disposal

Sewage disposal by dilution: essential conditions for dilution, self purification of streams, factors affecting self-purification, the oxygen sag curve (Streeter-Phelps equation), Sewage treatment by land treatment


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5.2.8 Sludge treatment and disposal

Sources of sludge and necessity of treatment, Aerobic and anaerobic digestion, Methods of sludge treatment: grinding and blending, thickening, stabilization, dewatering, drying, composting and incineration, Methods of sludge disposal: spreading on land, lagooning, dumping and land filling

5.2.9 Community participation and introduce following under this heading

Users committee, Village maintenance workers, Pre construction/during construction/post construction trainings, Women participation, Community mobilization/participation, Record keeping of WSP, Rehabilitation, Composting toilets, eco-sanitation

5.3 Environment

5.3.1 General introduction of air pollutants, its causes, impacts and remedial measures

5.3.2 Human excreta and its characteristics, pollution caused by excreta

5.3.3 Health aspects of water supply and sanitation

5.3.4 Green house effects, its impacts and remedial measures

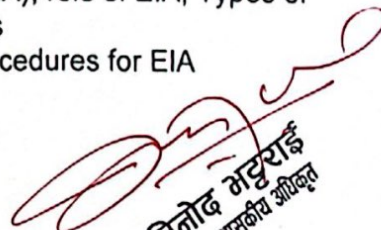
5.3.5 Solid waste management, Types and characteristics of solid waste

5.3.6 Garbage collection and disposal

5.3.7 Methods of solid waste disposal: dumping, sanitary landfill, incineration and composting

5.3.8 Concept of environmental assessment: Initial environmental examination (IEE), Environment impact assessment (EIA), role of EIA, Types of environmental impacts, and EIA principles

5.3.9 Government rules and regulations and procedures for EIA


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