काठमाडौं उपत्यका खानेपानी लिमिटेड

प्राविधिक सेवा, सिभिल समूह, ५ तह, ओभरसियर/सुपरभाईजर पदको खुल्ला तथा समावेशि र आन्तरीक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

१. प्रथम चरण : लिखित परिक्षाको योजना (**Examination Scheme**)

पत्र	बिषय	प्रश्न संख्या x अंकभार	परिक्षा प्रणाली	समय	पूर्णाङ्क	उत्तिर्णाङ्क
प्रथम पत्र	सेवा सम्बन्धी: Civil Engineering, खानेपानी तथा सरसफाई र काठमाण्डौ उपत्यका खानेपानी लिमिटेड	५०x१=५० १०x५=५०	बस्तुगत वहुउत्तर छोटो छोटो उत्तर	३ घण्टा	१००	४०

२. द्वितीय चरण : अन्तर्वार्ता योजना

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	२०	मौखिक

<u>द्रष्टव्य : उम्मेदवारहरुले ध्यान दिनुपर्ने कुराहरु</u>

१. लिखित परीक्षाको माध्यम नेपाली/अग्रेजी दुबै हुन सक्नेछ ।
२. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरु मात्र द्वितिय चरणको अन्तर्वार्तामा सम्मिलित हुन पाउनेछन् ।
३. पाठ्यक्रममा भएका यथा सम्भव सबै पाठ्यांशहरुबाट प्रश्न सोधिनेछ ।
४. यस पाठ्यक्रममा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका ऐन, नियमहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।
५. यस भन्दा अगाडि लागु भएको माथि उल्लेखित समूहको पाठ्यक्रम खारेज गरिएको छ ।
६. पाठयक्रम लागु मिति २०७३ आश्विन
७. खानेपानी तथा सरसफाई र काठमाण्डौ उपत्यका खानेपानी लिमिटेड सम्बन्धमा १५ प्र.श. प्रश्न सोधिनेछ ।

प्रथम पत्र
सेवा सम्बन्धीः Civil Engineering

1. Surveying

General

- 1.1.1 Classifications
- 1.1.2 Principles of Surveying
- 1.1.3 Selection of suitable method
- 1.1.4 Scales, plans and maps
- 1.1.5 Entry into survey field books and level books

1.2 Levelling

- 1.2.1 Methods of Levelling
- 1.2.2 Leveling instruments and accessories
- 1.2.3 Principles of Levelling

1.3 Plane Tabling

- 1.3.1 Equipments required
- 1.3.2 Methods of plane tabling
- 1.3.3 Two and Three points problems

1.4 Theodolite and Traverse Surveying

- 1.4.1 Basic difference between difference theodolite
- 1.4.2 Temporary adjustment of theodolitie
- 1.4.3 Fundamental lines and desired relations
- 1.4.4 Tacheometry: stadia method
- 1.4.5 Trigonometrical leveling
- 1.4.6 Checks in closed traverse

1.5 Contouring

- 1.5.1 Characteristics of contour lines
- 1.5.2 Method of locating contours
- 1.5.3 Contour ploting

1.6 Layout

- 1.6.1 Small building
- 1.6.2 Simple curves

2. Construction Materials

2.1 Stone

- 2.1.1 Formation & availability of stone in Nepal
- 2.1.2 Methods of laying and construction with various stones

2.2 Cement

- 2.2.1 Different cements: ingredients, properties and manufacture
- 2.2.2 Storage and transport
- 2.2.3 Admixtures

2.3 Clay and clay products

2.3.1 Brick : type, manufacture, laying, bonds

2.4 Paints and Varnishes
- 2.4.1 Type and selection
- 2.4.2 Preparation techniques
- 2.4.3 Use

2.5 Bitumen
- 2.5.1 Type
- 2.5.2 Selection
- 2.5.3 Use

3. Mechanics of Materials and Structures

3.1 Mechanics of materials
- 3.1.1 Internal effects of loading
- 3.1.2 Ultimate strength and working stress of materials

3.2 Mechanics of Beams
- 3.2.1 Relation between shear force and bending moments
- 3.2.2 Thrust, shear, and bending moments diagrams for statically determinate beams under various types of loading

4. Hydraulics

4.1 General
- 4.1.1 Properties of fluid: mass. Weight, specific weight, density. specific volume, specific gravity , viscosity
- 4.1.2 Pressure and Pascal's law

4.2 Hydro-Kinematics and Hydro-dynamics
- 4.2.1 Energy of flowing liquid: elevation energy, kinetics energy, potential energy, internal energy

4.3 Measurements of Discharge
- 4.3.1 Weirs and Notches
- 4.3.2 Discharge formulae

4.4 Flows: Characteristics of pipe flow and open channel flow

5. Soil Mechanics

5.1 General
- 5.1.1 Soil types and classification
- 5.1.2 Three phase system of soil
- 5.1.3 Unit weight of soil mass: bulk density, saturated density, submerged density and dry density
- 5.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index

5.2 Soil Water Relation
- 5.2.1 Tezaghi's principles of effective stress
- 5.2.2 Darcy's Law
- 5.2.3 Factors affecting permeability

5.3 Compaction of Soil
- 5.3.1 Factors affecting soil compaction

- 5.3.2 Optimum moisture content
- 5.3.3 Relation between dry density and moisture content

5.4 Shear Strength of Soils
- 5.4.1 Mohr-Coulomb Failure theory
- 5.4.2 Cohesion and angle of internal friction

5.5 Earth Pressure
- 5.5.1 Active and Passive earth pressure
- 5.5.2 Lateral earth pressure theory
- 5.5.3 Rankin's earth pressure theory

5.6 Foundation Engineering
- 5.6.1 Tezaghi's general bearing capacity formulae and their application

6. Structural Design

6.1 R.C. Sections in bending
- 6.1.1 Under reinforced, over reinforced, and balanced sections
- 6.1.2 Analysis of singles and double reinforced rectangular sections

6.2 Shear and Bond for RC sections
- 6.2.1 Shear resistance of RC section
- 6.2.2 Types of shear reinforcement and their design
- 6.2.3 Determination of anchorages length

6.3 Axially loaded RC columns
- 6.3.1 Short and long column
- 6.3.2 Design of a rectangular column section

6.4 Design and drafting of RC structures
- 6.4.1 Singly and doubly reinforced rectangular beams
- 6.4.2 Simple one way and two way slab
- 6.4.3 Axially loaded short and long column

7. Building construction Technology

7.1 Foundations
- 7.1.1 Subsoil exploration
- 7.1.2 Type and suitability of different foundations: shallow and deep
- 7.1.3 Shoring and dewatering
- 7.1.4 Design of simple brick or stone masonry foundations

7.2 Walls
- 7.2.1 Types of walls and their functions
- 7.2.2 Choosing wall thickness, height to length relation
- 7.2.3 Use of scaffolding

7.3 Damp Proofing
- 7.3.1 Source of dampness
- 7.3.2 Remedial measures to prevent dampness

7.4 Concrete technology
- 7.4.1 Constituents of cement concrete
- 7.4.2 Grading of aggregates
- 7.4.3 Concrete mixes
- 7.4.4 Water cement ratio

7.4.5 Factors affecting strength of concrete
7.4.6 Form wotk
7.4.7 Curing

7.5 Wood work
7.5.1 Frame and shutters of doors and window
7.5.2 Timber construction or upper floors
7.5.3 Design and construction of stairs

7.6 Flooring and finishing
7.6.1 Floor finishes: bricks, concrete, flag stone
7.6.2 Plastering

8. Water supply Engineering

8.1 Quantity of water
8.1.1 Design Period
8.1.2 Per capita demand
8.1.3 Population forecasting
8.1.4 Total water demand

8.2 Source of water supply
8.2.1 Surface source: River, spring
8.2.2 Groundwater source: tube well, infiltration gallery

8.3 Gravity Water supply system
8.2.1 Objectives of water supply system
8.2.2 Source of Water and its selection: gravity and artesian spring, shallow and deep wells,
8.2.3 Design period
8.2.4 Determination of daily water demand
8.2.5 Determination of storage tank capacity
8.2.6 Selection of pipe
8.2.7 Pipe line design and hydraulic grade line

8.4 Pump and pumping
8.4.1 Necessity of pumps
8.4.2 Classification of pumps
8.4.3 Working principles of pumps

8.5 Quality of Water
8.5.1 Physical, chemical, and biological impurities
8.5.2 Water Borne diseases

8.6 Purification of water
8.6.1 Sequence of water treatment
8.6.2 Sedimentation, coagulation and filtration
8.6.3 Disinfection of water

8.7 Distribution System
8.7.1 Water Pressure in Distribution system
8.7.2 Layout
8.7.3 Simple design criteria
8.7.4 Appurtenances in the distribution system

9. Sanitary Engineering
   - 9.1 Introduction to sewage, sewer, and sewerage
   - 9.2 Sewer
     - 9.2.1. Types of sewer
     - 9.2.2. Design of sewer:
     - 9.2.3. quantity of sanitary sewage, maximum,
     - 9.2.4. minimum and cleansing velocity
   - 9.3 Surface and storm water drainage
     - 9.3.1 Factors affecting storm water drainage
     - 9.3.2 Determination of storm water flow
     - 9.3.3 Laying and construction
   - 9.4 Sewer appurtenances
     - 9.4.1 Manholes (drop manhole, lamphole)
     - 9.4.2 Street inlet, catch drains
     - 9.4.3 grease traps
   - 9.5 Sewerage disposal and treatment
     - 9.5.1 Excreta disposal in un sewered area
     - 9.5.2 pit latrine
     - 9.5.3 design of septic tank

10 Estimating and Costing
   - 10.1 General
     - 10.1.1 Main items of work
     - 10.1.2 Units of measurement and payment of various items of work and materials
     - 10.1.3 Standard estimate formats of government offices
   - 10.2 Rate Analysis
     - 10.2.1 Basic general knowledge on the use of rate analysis norms prepared by Ministry of Physical Planning and Works and the districts rates prescribed.
   - 10.3 Specification
     - 10.3.1 Interpretation of specification
   - 10.4 Valuation
     - 10.4.1 Methods of valuation
     - 10.4.2 Basic general knowledge of standard formats used by commercial banks for valuation.

11 Construction Management
   - 11.1 Organization
     - 11.1.1 Need for organization
     - 11.1.2 Responsibilities of an civil overseer
     - 11.1.3 Relation between Owner, contractor
   - 11.2 Site Management
     - 11.2.1 Preparation of site plan
     - 11.2.2 Organizing labor
     - 11.2.3 Measures to improve labor efficiency
     - 11.2.4 Accident prevention
   - 11.3 Contract Procedure

11.3.1 Contracts
11.3.2 Departmental works and day works
11.3.3 Types of contracts
11.3.4 Tender and tender notice
11.3.5 Earnest money and security deposit
11.3.6 Preparation before inviting tender
11.3.7 Agreement
11.3.8 Conditions of contract
11.3.9 Construction supervision

11.4 Accounts
11.4.1 Administrative approval and technical sanction
11.4.2 Familiarity with standard account keeping formats used in government organizations
11.4.3 Muster roll
11.4.4 Completion report

11.5 Planning and control
11.5.1 Construction schedule
11.5.2 Equipment and materials schedules
11.5.3 Construction stages and operations
11.5.4 Bar chart

खानेपानी तथा सरसफाई र
काठमाण्डौ उपत्यका खानेपानी लिमिटेड

खानेपानी तथा सरसफाईः

१. नेपालमा खानेपानी तथा सरसफाईको अवस्था
२. शहरी सुविधा व्यवस्थापन
३. खानेपानी गुणस्तर नियन्त्रण सम्बन्धी विद्यमान ऐन तथा नियमहरु
४. खानेपानी चुहावट तथा नियन्त्रणका उपायहरु

काठमाण्डौ उपत्यका खानेपानी लिमिटेड सम्बन्धी :

१. सार्वजनिक नीजि साझेदारीको अवधारणा
२. खानेपानी महशुल निर्धारण आयोग
३. काठमाण्डौ उपत्यका खानेपानी व्यवस्थापन बोर्ड
४. आयोजना कार्यान्वयन निर्देशनालय
५. काठमाण्डौ उपत्यका खानेपानी लिमिटेडको ऐतिहासिक पृष्ठभुमि, प्रबन्धपत्र र नियमावली
६. कर्मचारी प्रशासन बिनियमावली, २०६४ (संशोधन सहित)
७. आर्थिक प्रशासन बिनियमावली, २०६४
८. सांगठनिक संरचना