

काठमाण्डौ उपत्यका खानेपानी लिमिटेड

प्राविधिक सेवा, सिभिल समुह, तह-५ ओभरसियर पदको

खुल्ला, समावेशी तथा आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

१. लिखित परीक्षाको विषय, पूर्णाङ्क, परीक्षा प्रणाली, प्रश्नसंख्या, अंकभार र समय निम्नानुसार हुनेछ ।

पत्र	विषय	पूर्णाङ्क	उतिर्णाङ्क		परीक्षा प्रणाली	प्रश्न संख्या	प्रति प्रश्न अंकभार	समय
प्रथम पत्र	(क) सामान्य ज्ञान, र सामान्य बौद्धिक परीक्षण र सेवा सम्बन्धी	१००	४०	बस्तुगत बहु वैकल्पिक प्रश्न	सामान्य ज्ञान सेवासँग सम्बन्धीत	३५	२	१ घण्टा
					बौद्धिक ज्ञान	१५	२	
द्वितीय पत्र	सेवा सम्बन्धी विस्तृत	१००	४०	विषयगत प्रश्न	छोटो उत्तर आउने प्रश्न	१०	५	३ घण्टा
					लामो उत्तर आउने प्रश्न	५	१०	

२. द्वितीय चरण: अन्तर्वार्ताको योजना

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	३०	मौखिक

३. प्रत्येक बस्तुगत प्रश्नमा चार वटा सम्भाव्य उत्तर दिइनेछ । जसमध्ये एउटा सही उत्तरमा (लोक सेवा आयोगले तोके बमोजिम) चिन्ह लगाउने वा लेख्नु पर्नेछ । प्रति गलत उत्तर वापत २० प्रतिशतका दरले अंक घटाइनेछ ।

४. प्रथमपत्र र द्वितीय पत्रको परीक्षा फरक फरक हुनेछ ।

५. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी हुन सक्नेछ ।

६. सामान्यतः प्रत्येक इकाईबाट प्रश्नहरू सोधिनेछन । प्रत्येक इकाईको अंक भार तोकिए बमोजिम हुनेछ । लामो उत्तर दिनुपर्ने प्रश्न एकै वा खण्ड खण्ड गरी (दुई वा सो भन्दा बढी) सोध्न सकिनेछ ।

७. यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरू परीक्षाको मिति भन्दा ३ महिना अगाडी (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।

८. परीक्षामा कालो मसी भएको कलम वा डटपेन मात्र प्रयोग गर्नुपर्नेछ ।

९. पाठ्यक्रम लागु मिति २०७८ श्रावण १ गते ।

प्रथम पत्र: सामान्य, ज्ञान सामान्य बौद्धिक परीक्षण र सेवा सम्बन्धी (१०० अंक)
प्रथमपत्र

१. सामान्य ज्ञान:

- १.१ सौर्यमण्डल: सूर्य, ग्रह, उपग्रह र तारा
- १.२ विश्वको भुगोल: महादेश, महासागर, अक्षांश, देशान्तर, अन्तराष्ट्रिय तिथि रेखा, समय, पर्वतश्रृंखला, नदी, हिमनदी, ताल, हिमताल, देश तथा तिनका राजधानी ।
- १.३ नेपालको भुगोल र आर्थिक तथा सामाजिक क्रियाकलाप: धरातलीय स्वरूपको किसिम र विशेषता, नेपालमा पाइने हावापानीको किसिम र विशेषता, तालतलैया, खनिज पदार्थ, प्राकृतिक स्रोत साधन, यातायात, विद्युत, शिक्षा, स्वास्थ्य, संचार, कृषि, उद्योग, पर्यटन, र व्यापार सम्बन्धी जानकारी ।
- १.४ नेपालको इतिहास: किराँतकाल, लिच्छवीकाल, मल्लकाल र आधुनिक इतिहासका प्रमुख घटना सम्बन्धी सामान्य जानकारी ।
- १.५ नेपालको सामाजिक एवं सास्कृतिक अवस्था: प्रथा, परम्परा, धर्म, जातजाति, भाषाभाषी, संस्कृति र साहित्य र संगित ।
- १.६ राष्ट्रिय महत्वका समसामायिक घटना तथा नविनतम गतिविधिहरू खेलकुद, पुरस्कार, कला, साहित्य लगायत महत्वपूर्ण व्यक्तित्वहरू सम्बन्धी जानकारी
- १.७ नेपालको जलश्रोत, सौर्य उर्जा, जलविद्युत विकास र काठमाण्डौ उपत्यका खानेपानी सम्बन्धी जानकारी
- १.८ नेपालको प्रचलित संविधान र नेपालको शासन प्रणाली सम्बन्धी जानकारी

२. बौद्धिक परीक्षण:

- २.१ शाब्दिक तार्किक परीक्षण: शब्दज्ञान, अनुक्रम, समरूपता, वर्गिकरण, कोडिङ्ग/डिकोडिङ्ग, छोडिएका अक्षर/संकेत मिलाउने, दिशा र दुरी ज्ञान परीक्षण, तार्किक विश्लेषण, श्रेणीक्रम (पंक्तिक्रम), आगमन, निगमन ।
- २.२ अशाब्दिक तार्किक परीक्षण: अनुक्रम, समरूपता, एकरूपता, वर्गिकरण, तार्किक चित्रात्मक विश्लेषण, भेन चित्र, मेट्रिक्स चित्र, त्रिभुज र वर्गहरूको रचना, चित्र वा आकृति बनावट र विश्लेषण ।

३. काठमाण्डौ उपत्यका खानेपानी लिमिटेड सम्बन्धी

- ३.१ सार्वजनिक नीजि साझेदारी अवधारणा
- ३.२ काठमाण्डौ उपत्यका खानेपानी लिमिटेडको ऐतिहासिक पृष्ठभूमि
- ३.३ काठमाण्डौ उपत्यका खानेपानी लिमिटेडको नियमावली
- ३.४ काठमाण्डौ उपत्यका खानेपानी लिमिटेड कर्मचारी प्रशासन विनियमावली (२०६४ संशोधन सहित)
- ३.५ काठमाण्डौ उपत्यका खानेपानी लिमिटेड आर्थिक प्रशासन विनियमावली २०६४

प्रथम पत्र खण्ड ख र द्वितीय पत्रको पाठ्यक्रमः

1. Surveying

1.1 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 Equipment's 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 different theodolites
- 1.4.2 Temporary adjustment of theodolites
- 1.4.3 Fundamental lines and desired relations
- 1.4.4 Tacheometry: stadia method
- 1.4.5 Trigonometrical levelling
- 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 plotting

1.6 Layout

- 1.6.1 Small building
- 1.6.2 Simple curves

1.7 Basic introduction to Geographical Information System (GIS)

- 1.7.1 Information on overview of GIS software
- 1.7.2 GIS and Map

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. Fluid Mechanics/Hydraulics

4.1 General

- 4.1.1 Properties of fluid: Mass density, specific weight, specific volume, specific gravity, viscosity and capillarity.
- 4.1.2 Pressure and its measurements, Pascal's, Pressure force

4.2 Hydro-Kinematics and Hydro-dynamics

- 4.2.1 Energy of flowing liquid: Equation Bernoulli, its physical meaning and application

4.3 Measurements of Discharge

- 4.3.1 Weirs and Notches
- 4.3.2 Discharge formulae

4.4 Flows: Characteristics of pipe and open channel flows

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 Terzaghi'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 work
- 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

8.8 Introduction to Supervisory Control and Data Acquisition (SCADA)

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, lamp hole)

9.4.2 Street inlet, catch drains

9.4.3 grease traps

9.5 Sewerage disposal and treatment

9.5.1 Excreta disposal in unsewered 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 a 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