

खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेड
स्तर: सहायक, सेवा/समूह: प्राविधिक/सिभिल इन्जिनियरिङ्ग, तह: ५, पद: वरिष्ठ सहायक
सब-इन्जिनियर खुला/आन्तरिक प्रतियोगितात्मक लिखित परीक्षाका लागि पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता

पूर्णाङ्क :- ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : - लिखित परीक्षा

पूर्णाङ्क :- २००

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	संस्थागत ज्ञान र सेवा सम्बन्धी	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न (MCQ)	५० प्रश्न X २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत	छोटो उत्तर लामो उत्तर	१२ प्रश्न X ५ अङ्क ४ प्रश्न X १० अङ्क	२ घण्टा ३० मिनेट

२. द्वितीय चरण : - अन्तर्वार्ता

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

- यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ ।
- प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र /विषयमा दिइए अनुसार हुनेछ ।
- परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- विषयगत प्रश्न हुने पत्रका हकमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्ने छ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- यस भन्दा अगाडि लागू भएका माथि उल्लेखित सेवा, समूहको पाठ्यक्रम खारेज गरिएको छ ।
- पाठ्यक्रम लागू मिति :-२०७९

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प्रथम र द्वितीय पत्र :- संस्थागत ज्ञान र सेवा सम्बन्धी
भाग (अ) – सेवा सम्बन्धी
खण्ड (क)

1. **Civil Engineering Drawing**

1.1 General

- 1.1.1 Importance, aims and objectives of drawing
- 1.1.2 Drawing equipments
- 1.1.3 Standard drawing sheets sizes
- 1.1.4 Drafting techniques and methods in common practice
- 1.1.5 Scales: Choice, use and conversion

1.2 Measured Drawing

- 1.2.1 Methods of measurement of horizontal and vertical dimensions
- 1.2.2 Sectional measurements
- 1.2.3 Dimensioning of sketches
- 1.2.4 Checking for missing details in field

1.3 Working Drawing

- 1.3.1 Role of working drawing
- 1.3.2 Interrelationship with estimate and specification
- 1.3.3 Construction detailing in plan and section
- 1.3.4 Significance of detailing in terms of accuracy of estimation, bill of quantities and construction supervision
- 1.3.5 Working drawing for private and public buildings, sanitary installation, electrification
- 1.3.6 Structural working drawings

2. **Estimating and Costing**

2.1 General

- 2.1.1 Purpose of estimating
- 2.1.2 Main items of work
- 2.1.3 Units of measurement and payment of various items of work and materials
- 2.1.4 Degree of accuracy
- 2.1.5 Standard estimate formats of Government of Nepal
- 2.1.6 Data for estimate
- 2.1.7 Preliminary estimate, Approximate quantity estimate, Detailed estimate and Revised estimate

2.2 Rate Analysis

- 2.2.1 Manufactures' cost
- 2.2.2 Transportation cost
- 2.2.3 Overheads
- 2.2.4 Need for contingencies
- 2.2.5 Use of Government Rate Analysis Norms

2.3 Specifications

- 2.3.1 Purpose, Types and Necessity
- 2.3.2 Interpretation of Specifications

2.4 Estimating

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- 2.4.1 Earthwork
- 2.4.2 Estimate of buildings
- 2.4.3 Estimate of sanitary installations
- 2.4.4 Estimate of electrical wiring and sanitary works
- 2.4.5 Annual maintenance
- 2.5 Valuation
 - 2.5.1 Purpose and Methods of valuation
 - 2.5.2 Standard formats used for Property Valuation in Nepal
- 3. **Management**
 - 3.1 Organization
 - 3.1.1 Need for organization
 - 3.1.2 Building agencies
 - 3.1.3 Structure of the Department of Urban Development and Building construction
 - 3.1.4 Responsibilities of a building sub engineer
 - 3.1.5 Relation between owner, contractor and consultants
 - 3.2 Accounts
 - 3.2.1 Familiarity with related Nepalese accounting system
 - 3.2.2 Administrative approval and technical sanction
 - 3.3 Planning and Control
 - 3.3.1 List of activities
 - 3.3.2 Construction, Equipment and materials schedule
 - 3.3.3 Construction stages and operations
 - 3.3.4 Bar Chart
 - 3.4 Building By-laws
 - 3.4.1 Sheet sizes, Scales, Setback, Height controls, FAR
- 4. **Surveying**
 - 4.1 General
 - 4.1.1 Primary divisions of survey
 - 4.1.2 Classification based on instruments and on methods
 - 4.1.3 Basic principle of surveying
 - 4.1.4 Scales, plans and maps
 - 4.1.5 System of field booking of surveying and levelling data
 - 4.1.6 Theodolite survey
 - 4.2 Levelling
 - 4.2.1 Classification of levelling work
 - 4.2.2 Methods of levelling
 - 4.2.3 Levelling instruments and accessories
 - 4.2.4 Principles of levelling
 - 4.2.5 Temporary and permanent adjustments of a level
 - 4.2.6 Profile levelling
 - 4.2.7 Booking and reducing levels
 - 4.3 Errors and their effects
 - 4.3.1 Kinds of errors
 - 4.3.2 Source of errors in chaining, levelling, plane tabling and compass surveying
 - 4.3.3 Effects of errors
 - 4.4 Plane Tabling

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- 4.4.1 Equipments used
- 4.4.2 Working operations
- 4.4.3 Methods of plane tabling
- 4.4.4 Merits and demerits of plane tabling
- 4.5 Contouring
 - 4.5.1 Definitions of terms
 - 4.5.2 Use contour maps
- 4.6 Setting out
 - 4.6.1 Small buildings
 - 4.6.2 Simple curves
 - 4.6.3 Locating the boundaries of farm lands
- 5. **Building Construction Technology**
 - 5.1 Foundations
 - 5.1.1 Function and necessity
 - 5.1.2 Subsoil exploration: test pit
 - 5.1.3 Safe bearing capacity of soils and its improvement
 - 5.1.4 Type and suitability of different foundations: shallow, deep (pile and well)
 - 5.1.5 Methods of excavating
 - 5.1.6 Shoring and dewatering
 - 5.1.7 Elements of simple spread foundation
 - 5.1.8 Stone masonry foundations, Raft foundation
 - 5.2 Walls
 - 5.2.1 Types of walls: solid wall, partition wall, cavity wall, curtain wall
 - 5.2.2 Features and their functions
 - 5.2.3 Types of stone masonry: rubble, hammer dressed and ashlar masonry
 - 5.2.4 Brick Masonry: English, Flemish, garden rat trap, monk
 - 5.2.5 Types of concrete blocks
 - 5.2.6 Choosing wall thickness, height to length relation
 - 5.2.7 Use of scaffolding
 - 5.2.8 Procedure of constructing various masonry walls
 - 5.3 Damp Proofing
 - 5.3.1 Source of dampness
 - 5.3.2 Remedial measures to prevent dampness
 - 5.3.3 Vertical and horizontal damp proofing
 - 5.3.4 Damp proofing materials
 - 5.4 Concrete Technology
 - 5.4.1 Constituents, mixing and use of lime concrete
 - 5.4.2 Constituents of cement concrete
 - 5.4.3 Grading of aggregates
 - 5.4.4 Concrete mixes, Water cement ratio
 - 5.4.5 Workability, Concrete laying
 - 5.4.6 Factors affecting strength of concrete
 - 5.4.7 Form work, Vibrators, Curing
 - 5.4.8 General introduction to Precast RC units
 - 5.4.9 Hydration and segregation
 - 5.5 Wood Work
 - 5.5.1 Frame and shutters of doors and windows

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- 5.5.2 Timber construction of upper floors
- 5.5.3 Design and construction of stairs
- 5.5.4 Double timber roofs
- 5.5.5 False ceiling
- 5.5.6 Sky-light: elements, functions and construction details

- 5.6 Steel Work
 - 5.6.1 Steel work in windows: Standards, elements and functions
 - 5.6.2 Tubular and angle steel roofs
 - 5.6.3 Iron grill and lattice work

खण्ड (ख)

6. Building Service

- 6.1 Water Supply
 - 6.1.1 General principle of water supply
 - 6.1.2 Water requirement standard for different buildings
 - 6.1.3 Storage and distribution of water
 - 6.1.4 Heating of water, storage and distribution requirements
- 6.2 Disposal system
 - 6.2.1 Septic tank, soak pit, vent and manhole
 - 6.2.2 Pipes for different sewage
 - 6.2.3 Incinerators
- 6.3 Electricity
 - 6.3.1 General principles of electrical installation and distribution
 - 6.3.2 Wiring systems in private and public building
 - 6.3.3 Ducts for electrical distribution
 - 6.3.4 Safety precautions
- 6.4 Lighting
 - 6.4.1 General principles of lighting
 - 6.4.2 Illumination requirements and standards
 - 6.4.3 Combination of artificial and natural light
 - 6.4.4 Lighting fixtures

7. Construction Materials

- 7.1 Stone
 - 7.1.1 Rocks and their characteristics
 - 7.1.2 Formation and availability of stones in Nepal
 - 7.1.3 Quarrying: excavation, Wedging and blasting
 - 7.1.4 Methods of laying and construction with various stones
- 7.2 Aggregates
 - 7.2.1 Fine and Coarse aggregates
 - 7.2.2 Availability and practice in Nepal
- 7.3 Cement
 - 7.3.1 Different cements: ingredients, properties and manufacture
 - 7.3.2 Storage and transport
 - 7.3.3 Admixtures
- 7.4 Metals and Alloys
 - 7.4.1 Wrought iron: Properties, use

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- 7.4.2 Steel: composition, properties, appearance, strength, constructional forms and manufacture
- 7.4.3 Corrosion and its prevention
- 7.4.4 Brass: uses
- 7.5 Bricks
 - 7.5.1 Type, Manufacture, Laying and availability and practice in Nepal
- 7.6 Lime : Manufacture, Types and properties, Uses
- 7.7 Paints and Varnishes
 - 7.7.1 Type and selection
 - 7.7.2 Preparation techniques and Uses
- 7.8 Floor Finishes
 - 7.8.1 Punning
 - 7.8.2 Tiles: mosaic, clay, concrete, vinyl
 - 7.8.3 Marble and flagstones
 - 7.8.4 Wooden boarding and parqueting
- 7.9 Wall Finishes
 - 7.9.1 Plasters: cement, lime, mud
 - 7.9.2 Punning: cement, lime
 - 7.9.3 Cladding: wood, stone, tiles
- 7.10 Roofing Materials
 - 7.10.1 Clay tiles, ceramic tiles and states
 - 7.10.2 CGI and UPVC
- 7.11 Miscellaneous Materials
 - 7.11.1 Glass, Plastics, Asphalt and Bitumen and Surkhi
- 8. **Structural Design**
 - 8.1 Timber Structures
 - 8.1.1 Allowable stresses
 - 8.1.2 Design of compression members
 - 8.1.3 Design of solid rectangular beams, design of simple steel beams
 - 8.1.4 Types of joints and their connections
 - 8.2 Steel Structures
 - 8.2.1 Rivetted and welded connections: types, uses, detailing
 - 8.2.2 Detailing of simple roof trusses
 - 8.2.3 Detailing of rolled steel beams
 - 8.2.4 Detailing of column bases
 - 8.3 R.C. Sections in Bending
 - 8.3.1 Basis assumptions
 - 8.3.2 Position of neutral axis
 - 8.3.3 Moment of resistance
 - 8.3.4 Under reinforced, over reinforced and balanced sections
 - 8.3.5 Analysis of singly and doubly reinforced rectangular sections
 - 8.3.6 Analysis of singly reinforced flanged sections
 - 8.4 Shear and Bond for Reinforced Concrete (RC) Sections
 - 8.4.1 Behaviour of R.C. section in shear
 - 8.4.2 Shear resistance of R.C. section
 - 8.4.3 Types of shear reinforcement and their design
 - 8.4.4 Local and anchorage bond
 - 8.4.5 Determination of anchorage length

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- 8.4.6 Bar curtailment
- 8.5 8.5 Axially Loaded R.C
 - 8.5.1 Short and long columns
 - 8.5.2 Design of a rectangular column section
 - 8.5.3 Reinforcement detailing
- 8.6 Design and Detailing of R.C Structures
 - 8.6.1 IS code requirements
 - 8.6.2 Methods of design
 - 8.6.3 Singly reinforced T and L beams
 - 8.6.4 Simple one-way and two-way slabs
 - 8.6.5 Simple pad footings for columns
 - 8.6.6 Preparation of bar bending for RC design
- 8.7 Earthquake Resistant Design of Non-engineered Structures
 - 8.7.1 History of Earthquake in Nepal and damages
 - 8.7.2 Weakness of existing building
 - 8.7.3 Site consideration
 - 8.7.4 Building form, shape and size
 - 8.7.5 Size and location of openings
 - 8.7.6 Selection of materials
 - 8.7.7 Construction technology
 - 8.7.8 Seismic resistant components : through stone, vertical and horizontal reinforcement, diaphragm, boxing of building, lateral restrainers, unsupported length of wall, corner and junction of wall/connection of building components
- 9. **Water Supply and Sanitation Engineering**
 - 9.1 General
 - 9.1.1 Objectives of water supply system
 - 9.1.2 Source of water and its selection: gravity and artisan springs, shallow and deep wells; infiltration galleries
 - 9.2 Gravity Water Supply System
 - 9.2.1 Design period
 - 9.2.2 Determination of daily water demand
 - 9.2.3 Determination of storage tank capacity
 - 9.2.4 Selection of pipe
 - 9.2.5 Pipe line design and hydraulic grade line
 - 9.3 Design of Sewer
 - 9.3.1 Quantity of sanitary sewage
 - 9.3.2 Maximum, Minimum and self-cleaning velocity
 - 9.4 Excreta Disposal and Unsewered Area
 - 9.4.1 Pit latrine
 - 9.4.2 Design of septic tank
- 10. **Highway Engineering**
 - 10.1 General
 - 10.1.1 Introduction to transportation systems
 - 10.1.2 Historic development of roads
 - 10.1.3 Classification of road in Nepal
 - 10.1.4 Basic requirements of road alignment

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- 10.2 Geometric Design
 - 10.2.1 Basic design control and criteria for design
 - 10.2.2 Elements of cross section, typical cross-section for all roads in filling and cutting
 - 10.2.3 Camber
 - 10.2.4 Determination of radius of horizontal curves
 - 10.2.5 Superlevation
 - 10.2.6 Sight distances
 - 10.2.7 Gradient
 - 10.2.8 Use of Nepal Road Standard and subsequent revision in road design
- 10.3 Drainage System
 - 10.3.1 Importance of drainage system and requirements of a good drainage system
- 10.4 Road Pavement
 - 10.4.1 Pavement structure and its components: subgrade, sub-base, base and surface courses
- 10.5 Road Machineries
 - 10.5.1 Earth moving and compacting machines
- 10.6 Road Construction Technology
- 10.7 Bridge
 - 10.7.1 T-beam bridge
 - 10.7.2 Timber bridges
- 10.8 Road Maintenance and Repair
 - 10.8.1 Type of maintenance Works
- 10.9 Tracks and Trails

भाग (आ) - संस्थागत ज्ञान
खण्ड (ग)

- 11. **संविधान, ऐन र नियमहरू तथा संस्थागत ज्ञान**
 - 11.1 नेपाल खाद्य व्यवस्था तथा व्यापार कम्पनीको परिचय, संगठनात्मक संरचना र कार्यक्षेत्र
 - 11.2 नेपाल खाद्य व्यवस्था तथा व्यापार कम्पनीको प्रवन्धपत्र र नियमावली
 - 11.3 खाद्य व्यवस्था तथा व्यापार कम्पनी कर्मचारी सेवा, शर्त र सुविधा सम्बन्धी विनियमावली २०७९
 - 11.4 खाद्य व्यवस्था तथा व्यापार कम्पनी खरिद तथा आर्थिक प्रशासन विनियमावली, २०७९
 - 11.5 नेपालको वर्तमान संविधान, २०७२ (खाद्य तथा कृषि) सम्बन्धी जानकारी
 - 11.6 सार्वजनिक खरिद ऐन, २०६३ (परिच्छेद १ र २)
 - 11.7 वातावरण संरक्षण ऐन, २०७६ र वातावरण संरक्षण नियमावली, २०७७
 - 11.8 उपभोक्ता हित संरक्षण ऐन, २०७५
 - 11.9 अन्तर्राष्ट्रिय खाद्य तथा कृषि सम्बन्धी संघ संस्थाहरू: इफाड (IFAD), खाद्य तथा कृषि संगठन (FAO) र विश्व खाद्य कार्यक्रम (WFP) सम्बन्धी जानकारी

प्रथम पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरू सोधिने छ ।

प्रथम पत्र (वस्तुगत)					
भाग	विषय	खण्ड	परीक्षा प्रणाली	अङ्कभार	प्रश्न संख्या
(अ)	सेवा सम्बन्धी	(क)	बहुवैकल्पिक	४०	२० प्रश्न X २ अङ्क = ४०
		(ख)	प्रश्न (MCQs)	४०	२० प्रश्न X २ अङ्क = ४०

खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेड
स्तर: सहायक, सेवा/समूह: प्राविधिक/सिभिल इन्जिनियरिङ्ग, तह: ५, पद: वरिष्ठ सहायक
सब-इन्जिनियर खुला/आन्तरिक प्रतियोगितात्मक लिखित परीक्षाका लागि पाठ्यक्रम

(आ)	संस्थागत ज्ञान	(ग)		२०	१० प्रश्न X २ अङ्क = २०
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द्वितीय पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरू सोधिनेछ ।

द्वितीय पत्र (विषयगत)					
भाग	विषय	खण्ड	अङ्कभार	छोटो उत्तर	लामो उत्तर
(अ)	सेवा सम्वन्धी	(क)	५०	६ प्रश्न X ५ अङ्क = ३०	२ प्रश्न X १० अङ्क = २०
		(ख)	५०	६ प्रश्न X ५ अङ्क = ३०	२ प्रश्न X १० अङ्क = २०