

विरगंज उप-महानगरपालिका
सहायकस्तर पाँचौ तह, धारा मिस्त्री
पदको खुला/आन्तरिक लिखित परीक्षाको पाठ्यक्रम

यस पाठ्यक्रमलाई दुई भागमा विभाजन गरिएको छ ।

भाग	परीक्षा	विषय	पूर्णाङ्क	प्रश्न संख्या	समय	परीक्षा प्रणाली	उत्तीर्णाङ्क
१	लिखित	सेवा सम्बन्धी	१००	५०	४५ मिनेट	वस्तुगत बहुउत्तर (Multiple Choice)	४०
२	अन्तर्वार्ता		२०				

- लिखित परीक्षामा यथासम्भव पाठ्यक्रमको सबै एकाइहरूबाट प्रश्नहरू सोधिनेछ ।
- वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरूको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत २ (दुई) अङ्क प्रदान गरिनेछ, भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात् ०.४ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरू परीक्षाको मिति भन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ ।
- लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र अन्तर्वार्तामा सम्मिलीत गराईनेछ ।

1. Surveying

- 1.1 General
 - 1.1.1 Classifications
 - 1.1.2 Principle 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 Levelling 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 point problems
- 1.4 Theodolite and Traverse surveying
 - 1.4.1 Basic difference between different theodolites
 - 1.4.2 Temporary adjustments 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 Setting Out
 - 1.6.1 Small buildings
 - 1.6.2 Simple curves

2. Construction Materials

- 2.1 Stone
 - 2.1.1 Formation and availability of stones 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 moment
 - 3.2.2 Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading
 - 3.3 Simple Strut Theory
- 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, Kinetic energy, potential energy, internal energy
 - 4.3 Measurement of Discharge
 - 4.3.1 Weirs and notches
 - 4.3.2 Discharge formulas
 - 4.4 Flows
 - 4.4.1 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 Terzaghi's principle 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 Pressures
 - 5.5.1 Active and passive earth pressures
 - 5.5.2 Lateral earth pressure theory
 - 5.5.3 Rankine's earth pressure theory
- 5.6 Foundation Engineering
 - 5.6.1 Terzaghi's general bearing capacity formulas 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 single and double reinforced rectangular sections
- 6.2 Shear and Bond for R.C. Sections
 - 6.2.1 Shear resistance of a R.C. section
 - 6.2.2 Types of Shear reinforcement and their design
 - 6.2.3 Determination of anchorage length
- 6.3 Axially Loaded R.C. Columns
 - 6.3.1 Short and long columns
 - 6.3.2 Design of a rectangular column section
- 6.4 Design and Drafting of R.C. Structures
 - 6.4.1 Singly and doubly reinforced rectangular beams
 - 6.4.2 Simple one-way and two-way slabs
 - 6.4.3 Axially loaded short and long columns

7. Building Construction Technology

- 7.1 Foundations
 - 7.1.1 Subsoil exploration
 - 7.1.2 Type and suitability of different foundations: Shallow, deep
 - 7.1.3 Shoring and dewatering
 - 7.1.4 Design of simple brick or stone masonry foundations
- 7.2 Walls
 - 7.2.1 Type 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 door and window
 - 7.5.2 Timber construction of upper floors
 - 7.5.3 Design and construction of stairs
- 7.6 Flooring and Finishing
 - 7.6.1 Floor finishes : brick, concrete, flagstone
 - 7.6.2 Plastering

8. Water Supply and Sanitation Engineering

- 8.1 General
 - 8.1.1 Objectives of water supply system
 - 8.1.2 Source of water and its selection: gravity and artisan springs, shallow and deep wells; infiltration galleries.
- 8.2 Gravity Water Supply System
 - 8.2.1 Design period
 - 8.2.2 Determination of daily water demand
 - 8.2.3 Determination of storage tank capacity
 - 8.2.4 Selection of pipe
 - 8.2.5 Pipe line design and hydraulic grade line
- 8.3 Design of Sewer
 - 8.3.1 Quantity of sanitary sewage
 - 8.3.2 Maximum, Minimum and self cleaning velocity
- 8.4 Excreta Disposal and Unsewered Area
 - 8.4.1 Pit latrine
 - 8.4.2 Design of septic tank

9. Irrigation Engineering

- 9.1 General
 - 9.1.1 Advantages and Disadvantages of irrigation
- 9.2 Water Requirement
 - 9.2.1 Crop season and principal crops
 - 9.2.2 Base period
- 9.3 Flow irrigation Canals
 - 9.3.1 Canal losses and their minimization
 - 9.3.2 Maximum and minimum velocities
 - 9.3.3 Design of irrigation canal section based on manning's formula
 - 9.3.4 Need and location of spillways
 - 9.3.5 Head works for small canals

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

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, 2027 (First Revision 2045) 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

11. Estimating and Costing

11.1 General

- 11.1.1 Main items of work
- 11.1.2 Units of measurement and payment of various items of work and material
- 11.1.3 Standard estimate formats of government offices

11.2 Rate Analysis

- 11.2.1 Basic general knowledge on the use of rate analysis norms prepared by Ministry of Works and Transport and the district rates prescribed by district development committee

11.3 Specifications

- 11.3.1 Interpretation of specifications
- 11.4 Valuation
 - 11.4.1 Methods of valuation
 - 11.4.2 Basic general knowledge of standard formats used by commercial banks and NIDC for valuation

12. Construction Management

- 12.1 Organization
 - 12.1.1 Need for organization
 - 12.1.2 Responsibilities of a civil overseer
 - 12.1.3 Relation between Owner, Contractor and Engineer
- 12.2 Site Management
 - 12.2.1 Preparation of site plan
 - 12.2.2 Organizing labor
 - 12.2.3 Measures to improve labor efficiency
 - 12.2.4 Accident prevention
- 12.3 Contract Procedure
 - 12.3.1 Contracts
 - 12.3.2 Departmental works and day-work
 - 12.3.3 Types of contracts
 - 12.3.4 Tender and tender notice
 - 12.3.5 Earnest money and security deposit
 - 12.3.6 Preparation before inviting tender
 - 12.3.7 Agreement
 - 12.3.8 Conditions of contract
 - 12.3.9 Construction supervision
- 12.4 Accounts
 - 12.4.1 Administrative approval and technical sanction
 - 12.4.2 Familiarity with standard account keeping formats used in governmental organizations
 - 12.4.3 Muster roll
 - 12.4.4 Completion report
- 12.5 Planning and Control
 - 12.5.1 Construction schedule
 - 12.5.2 Equipment and materials schedule
 - 12.5.3 Construction stages and operations
 - 12.5.4 Bar chart

13. Airport Engineering

- 13.1 General
 - 13.1.1 Introduction to Air Transport System
 - 13.1.2 Historic development of Airports in Nepal
 - 13.1.3 Classification of Airports

- 13.1.4 Airport terminologies
 - 13.2 Design
 - 13.2.1 Basic design control and criteria for design
 - 13.2.2 General items contained in ANNEX 14 (ICAO Publication)
 - 13.2.3 Planning of Airport and its elements
 - 13.2.4 Terminal Building and Control Tower
 - 13.2.5 Drainage System
 - 13.2.6 Geometric design, pavement structure and its component
 - 13.2.7 Basic knowledge of Heliport and Hangers
 - 13.3 Airport Maintenance
 - 13.3.1 Types of maintenance
 - 13.3.2 Methods of maintenance
 - 14. स्थानीय निकायको प्रशासन
 - १. स्थानीय स्वायत्त शासन ऐन, २०५५
 - २. स्थानीय स्वायत्त शासन नियमावली, २०५६
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