

अनुसूची -५

(दफ्त ७(२) सँग सम्बन्धित)

प्रविधिक सहायकको पाठ्यक्रम

तक-१ सेवा सम्बन्धी

का) प्रशासन सम्बन्धी -१० बर्ग

तक-१ बन्दा

१. प्रशासनम्बन्धी सेवागार कार्यक्रम संघलन निर्देशिका, २०७५, कामका लागि परिक्रमिकम बाबतित ससुपयिक बायोजन संघलन तल्ला व्यवसलपन कार्यकिरी, २०७६ र युता सेवागरीक लागि सपगतसण पहल बायोजन (संघलन तल्ला व्यवसलपन कार्यकिरी, २०७६,
२. कामका लागि परिक्रमिक (Cash for Work) को अकारण,
३. ससयिक परिसलन, ससयनिक सुनुवर्द, ससयिक सेखापरीलण तल्ला गुतासे व्यवसलपन,
५. सलानीय तल्लको सजेट तर्जुम प्रकृता, ससय व्यवसलपन र सेखा परीलण,
५. बाधरण तल्ला अनुसलन र सुसलन।

ख) प्रविधिक कार्य सम्बन्धी परील- ५० बर्ग

1. Surveying
 - 1.1 Levelling
 - 1.1.1 Principles and methods of levelling
 - 1.2.2 Levelling instruments and accessories
 - 1.2 Plane Tabling
 - 1.2.1 Equipments required
 - 1.2.2 Methods of plane tabling
 - 1.2.3 Two and three point problems
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: Type and selection; preparation techniques and use
- 2.5 Bitumen: Type, selection and 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 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
 - 5.4 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 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

6. Structures

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 section

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 Design and Working System 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 and thickness of walls
- 7.2.2 Use of scaffolding

7.3 Damp Proofing

- 7.3.1 Source of Dampness
- 7.3.2 Remedial measures for damp proofing

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 Need for irrigation; advantages of irrigation

9.1.2 Sources of irrigation: water, river & streams, ground water and others

9.1.3 Methods of irrigation: surface, sub-surface and others

9.2 Irrigation Water Requirement

9.2.1 Crop season, principal crops, and crop water requirements

9.2.2 Base period & duty

9.3 Irrigation Canals

9.3.1 Canal losses and their minimization

9.3.2 Irrigation requirements and design discharge of canal permissible velocities for different canals

9.3.3 Design of canal based on Manning's & Lacey's formulae

9.3.4 Need and location of escapes

9.3.5 Components of distribution system

10. Highway Engineering

10.1 General

10.1.1 Classification of road in Nepal

10.1.2 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 Super elevation

- 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: 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 Road Maintenance and Repair: Type of maintenance works
 - 10.8 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 Site Management
 - 12.1.1 Preparation of site plan
 - 12.1.2 Organizing labor
 - 12.1.3 Measures to improve labor efficiency
 - 12.1.4 Accident prevention

12.2 Procurement and Contract Procedure

- 12.2.1 Contracts and its types
- 12.2.2 Departmental works and day-work
- 12.2.3 Preparation of tender document
- 12.2.4 Tender procedure
- 12.2.5 Contract agreement
- 12.2.6 Conditions of contract
- 12.2.7 Construction supervision

12.3 Planning and Control

- 12.3.1 Construction schedule
- 12.3.2 Equipment and materials schedule
- 12.3.3 Construction stages and operations

अंक-३: कंप्यूटर सम्बंधी प्रयोगात्मक परीक्षा -५० अंक

समय: ३० मिनट

1. Computer fundamental
2. Operating System
3. Word processing
4. Electronic spreadsheet
5. Database management system
6. Presentation system
7. Internet Browsing & Website Management.