

परिशिष्ट:-४

(दफा-५(५) सँग सम्बन्धित)

प्राविधिक सहायकको पाठ्यक्रम

(क) सेवा सम्बन्धी

खण्ड-१:- प्रशासनिक कार्य सम्बन्धी

१. रोजगारीको हकसम्बन्धी ऐन, २०७५ र रोजगारीको हकसम्बन्धी नियमावली, २०७५,
२. प्रधानमन्त्री रोजगार कार्यक्रम संचालन निर्देशिका, २०७५, कामका लागि पारिश्रमिकमा आधारित सामूदायिक आयोजना सञ्चालन तथा व्यवस्थापन कार्यविधि, २०७६ र युवा रोजगारीका लागि रुपान्तरण पहल आयोजना (संचालन तथा व्यवस्थापन) कार्यविधि, २०७६,
३. कामका लागि पारिश्रमिक (Cash for Work) को अवधारणा,
४. स्थानीय तहको बजेट तर्जुमा प्रकृया, खर्च व्यवस्थापन र लेखा परीक्षण तथा गुनासो व्यवस्थापन,
५. सामाजिक परिचालन, सार्वजनिक सुनुवाई, सामाजिक लेखापरीक्षण तथा गुनासो व्यवस्थापन, र
६. आचरण तथा अनुशासन र सुशासन।

खण्ड-२:- प्राविधिक कार्य सम्बन्धी

- स्थानीय सेवाको इन्जिनियरिङ् सेवा, सिभिल समूह पाँचौं तह सब-इन्जिनियर पदको लोकसेवा आयोगले निर्धारण गरेको देहाय बमोजिमको पाठ्यक्रमका विषयवस्तुहरु:

1. Surveying

1.1 General

1.1.1 Principle and types of surveying

1.1.2 Units, scales and maps

1.1.3 Field books and Level books

1.2 Levelling

1.2.1 Principles and methods of levelling

1.2.2 Levelling instruments and accessories

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: Small buildings and 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: 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

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 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. 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 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 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 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 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 Bridge: T-beam bridge and Timber bridges
- 10.8 Road Maintenance and Repair: Type of maintenance works
- 10.9 Tracks and Trails
- 10.10 **Airport Engineering:** Planning and layout of Heliports; Terminal Building and Control Tower; Drainage System for Airports

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 Sub- engineer
 - 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 Procurement and Contract Procedure

- 12.3.1 Contracts and its types
- 12.3.2 Departmental works and day-work
- 12.3.3 Preparation of tender document
- 12.3.4 Tender procedure
- 12.3.5 Contract agreement
- 12.3.6 Conditions of contract
- 12.3.7 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

(ख) कम्प्युटर सम्बन्धी

1. Computer fundamental
2. Operating System
3. Word processing
4. Electronic spreadsheet
5. Database management system
6. Presentation system

प्राविधिक सहायकको कार्यविवरण

कार्यसम्पादन सम्झौता र कार्यविवरण: कामकाज गर्न खटिएको प्राविधिक सहायकलाई प्रमुख प्रशासकीय अधिकृतले परिशिष्ट ७ बमोजिम कार्यसम्पादन सम्झौता गर्ने तथा प्रधानमन्त्री रोजगार कार्यक्रम र युवा रोजगारीका लागि रूपान्तरण पहल आयोजना सम्बन्धमा प्राविधिक सहायकको जिम्मेवारीहरु देहाय बमोजिम हुने गरी कामकाजमा खटाउनु पर्नेछ: -

१. रोजगार सेवा केन्द्र र रोजगार उपभोक्ता समूहबीच समन्वय गर्ने,
२. आयोजनामा भएको भौतिक प्रगति तथा लाभग्राहीले पाएको पारिश्रमिक विवरण तयार गर्ने ।
३. सार्वजनिक रोजगारी सिर्जनाका लागि स्थानीय तहलाई सहयोग गर्ने,
४. सार्वजनिक पूर्वाधार मार्फत रोजगारी सिर्जनाका लागि कार्यान्वयन गरिने आयोजनाको पूर्वसम्भाव्यता, सम्भाव्यता, डिजाइन, विस्तृत लागत अनुमान र कार्य सम्पन्न भएपछि अन्तिम मूल्यांकन गर्ने,
५. आयोजनाको प्राविधिक अनुगमन तथा सुपरीवेक्षण गरी तोकिएको गुणस्तर कायम गर्ने गराउने,
६. रोजगार आयोजना सञ्चालनका लागि श्रमिक तथा रोजगार उपभोक्ता समितिलाई रोजगार आयोजनाको प्राविधिक पक्षमा अभिमुखीकरण वा तालिम प्रदान गर्ने।

७. रोजगार आयोजनाको व्यवस्थापन र कार्यान्वयनमा स्थानीय तहलाई सहयोग गर्न देहायका क्रियाकलाप गर्ने:
- लाभग्राही हाजिरी राख्न लगाउने ।
 - ज्यालाको भुक्तानी बैङ्क मार्फत गर्न सहजीकरण गर्ने ।
 - वार्षिक आर्थिक योजना र बजेट निर्माण प्रक्रिया, योजनाको समीक्षा, तथा रोजगारमूलक योजना छनौटमा सहयोग गर्ने ।
 - आवश्यकता अनुसार रोजगार आयोजनाहरूको स्थलगत अनुगमन गरी प्रतिवेदन पेश गर्ने ।
८. कार्गत तालिमा तथा जीवन उपयोगी सीप विकास तालिमको योजना, सञ्चालन तथा व्यवस्थापन गर्न स्थानीय तहलाई सहयोग गर्न देहाय बमोजिमका जिम्मेवारी वहन गर्ने:
- कामको शिलशिलामा प्राप्त हुने तालिम र जीवन उपयोगी सीप विकास तालिमकर्तालाई कामदार/प्रशिक्षार्थीहरूको संख्या,तालिमस्थल/केन्द्रको छनौट र लाभग्राही/प्रशिक्षार्थीहरूलाई तालिमको मिति र स्थानको जानकारी उपलब्ध गराउने
 - आयोजना व्यवस्थापन इकाई मार्फत सञ्चालन गरिएको तालिमको गुणस्तर तोकिएको मापदण्ड बमोजिम भएको सुनिश्चित गर्ने;
 - रोजगार संयोजक र रोजगार सहायकसंग समन्वय गरेर प्रधानमन्त्री रोजगार कार्यक्रम-रोजगार व्यवस्थापन सूचना प्रणालीमा लाभग्राहीलाई दिएका कामको शिलशिलामा प्राप्त हुने तालिम र जीवन उपयोगी सीप विकास तालिमको जानकारी अद्यावधिक गर्ने ।
९. रोजगार संयोजक र प्रमुख प्रशासकीय अधिकृतले तोके बमोजिम आयोजनासँग सम्बन्धित अन्य कार्य गर्ने ।
१०. रोजगार आयोजनाको प्रभावकारी कार्यान्वयनका लागि स्थानीय तहको आयोजनासँग सम्बन्धित प्रशासकीय, वित्तीय र संरक्षण सम्बन्धी क्रियाकलापमा सहायता प्रदान गर्न अर्को व्यवस्था नभएसम्म देहायका थप क्रियाकलाप गर्ने:-
- आयोजनासँग सम्बन्धित वातावरण तथा सामाजिक संरक्षणका क्रियाकलापहरू सञ्चालन भएको सुनिश्चित गर्ने ।