

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश इन्जिनियरिङ सेवा, सिभिल समूह, जनरल, हाईवे, स्यानिटरी, इरिगेशन, हाइड्रोपावर, हाइड्रोलोजी उपसमूह तथा स्थानीय इन्जिनियरिङ सेवा, सिभिल समूह पाँचौ तहका पदहरुको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छः

भाग - १

लिखित परीक्षा (Written Examination):- प्रथम चरण पूर्णाङ्कः- १००
द्वितीय चरण पूर्णाङ्कः- १००

भाग - २

अन्तिम चरण (Final Examination) :- अन्तर्वार्ता पूर्णाङ्कः- ३०

लिखित परीक्षा योजना (Written Examination Scheme)

१. लिखित परीक्षा:— प्रथम चरण (First Phase)

तालिका (१)

| पत्र | विषय | पूर्णाङ्क | उत्तीर्णाङ्क | परीक्षा प्रणाली | | प्रश्न संख्या × अङ्क | समय |
|-------|--|-----------|--------------|---------------------|--|------------------------------|----------|
| प्रथम | सामान्य ज्ञान र सार्वजनिक व्यवस्थापन (General Awareness & Public Management) | १०० | ४० | वस्तुगत (Objective) | बहुवैकल्पिक प्रश्न (Multiple Choice Questions) | २० प्रश्न × २ अङ्क (४० अङ्क) | ४५ मिनेट |
| | सेवा सम्बन्धित कार्य-ज्ञान (Job Based knowledge) | | | | | ३० प्रश्न × २ अङ्क (६० अङ्क) | |

२. लिखित परीक्षा:- द्वितीय चरण (Second Phase)

तालिका (२)

| पत्र | विषय | पूर्णाङ्क | उत्तीर्णाङ्क | परीक्षा प्रणाली | | प्रश्न संख्या × अङ्क | समय |
|---------|--|-----------|--------------|---------------------|---|--|------------------|
| द्वितीय | सेवा सम्बन्धित कार्य-ज्ञान (Job Based knowledge) | १०० | ४० | विषयगत (Subjective) | छोटो उत्तर (Short Answer) लामो उत्तर (Long Answer) | १२ प्रश्न × ५ अङ्क ४ प्रश्न × १० अङ्क | २ घण्टा १५ मिनेट |

अन्तिम चरण - अन्तर्वार्ता (Interview)

तालिका (३)

| विषय | पूर्णाङ्क | उत्तीर्णाङ्क | परीक्षा प्रणाली | समय |
|--------------------------|-----------|--------------|--------------------|-----|
| अन्तर्वार्ता (Interview) | ३० | | बोर्ड अन्तर्वार्ता | - |

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द्रष्टव्यः

१. यो पाठ्यक्रम योजनालाई लिखित परीक्षा (प्रथम चरण र द्वितीय चरण) तथा अन्तिम चरण (अन्तर्वार्ता) गरी दुई भागमा विभाजन गरिएको छ ।
२. लिखित परीक्षाको प्रश्नपत्रको माध्यम भाषा पाठ्यक्रमको विषयवस्तु जुन भाषामा छ सोही भाषाको आधारमा नेपाली वा अंग्रेजी मध्ये कुनै एक मात्र भाषा हुनेछ । तर विषयवस्तुलाई स्पष्ट गर्नुपर्ने अवस्थामा दुवै भाषा समेत प्रयोग गर्न सकिने छ ।
३. लिखित परीक्षाको माध्यम नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको 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 ।
५. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
६. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धितपत्र/विषयमा दिईए अनुसार हुनेछ ।
७. विषयगत प्रश्न हुने पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
८. यस पाठ्यक्रम योजना अन्तर्गतिकापत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
९. प्रथम चरण (**First Phase**) को लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरण (**Second Phase**) को लिखित परीक्षामा सम्मिलित गराइनेछ ।
१०. लिखित परीक्षाको प्रथम चरण (**First Phase**) मा प्राप्त गरेको प्राप्ताङ्को शतप्रतिशत अङ्क तथा द्वितीय चरण (**Second Phase**) को प्राप्ताङ्कहरु जोडी कूल अङ्कको आधारमा लिखित परीक्षाको नतिजा प्रकाशित गरिनेछ ।
११. लिखित परीक्षामा छनौट भएका उम्मेदवारहरुलाई मात्र अन्तिम चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।
१२. लिखित परीक्षा र अन्तिम चरणको अन्तर्वार्ताको कुल अङ्क योगका आधारमा अन्तिम परीक्षाफल प्रकाशित गरिनेछ ।
१३. पाठ्यक्रम लागू मिति: - २०८२।०८।०९

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प्रथम पत्र (Paper I) :-

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन तथा सेवा सम्बन्धित कार्य-ज्ञान

भाग-१ (Part I) :

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन

(General Awareness and Public Management)

खण्ड-क (Section - A) : (१० प्रश्न×२ अङ्क = २० अङ्क)

१. सामान्य ज्ञान (General Awareness)

(२० अङ्क)

- १.१ नेपालको भौगोलिक अवस्था, प्राकृतिक स्रोत र साधनहरु
- १.२ नेपालको ऐतिहासिक, सांस्कृतिक र सामाजिक अवस्था सम्बन्धी जानकारी
- १.३ नेपालको आर्थिक अवस्था र आवधिक योजना र गण्डकी प्रदेशको आवधिक योजना सम्बन्धी जानकारी
- १.४ जैविक विविधता, दिगो विकास, वातावरण, प्रदुषण, जलवायु परिवर्तन र जनसंख्या व्यवस्थापन
- १.५ मानव जीवनमा प्रत्यक्ष प्रभाव पार्ने विज्ञान र प्रविधिका महत्वपूर्ण उपलब्धिहरु
- १.६ जनस्वास्थ्य, रोग, खाद्य र पोषण सम्बन्धी सामान्य जानकारी
- १.७ नेपालको संविधान (भाग १ देखि ५ सम्म र अनुसूचीमा भएका व्यवस्थाहरु)
- १.८ नेपालमा संघीय लोकतान्त्रिक गणतन्त्रात्मक शासन प्रणाली सम्बन्धी जानकारी
- १.९ संयुक्त राष्ट्रसंघ र यसका विशिष्टीकृत संस्था सम्बन्धी जानकारी
- १.१० क्षेत्रीय संगठन (सार्क, बिमस्टेक, आसियान र युरोपियन संघ) सम्बन्धी जानकारी
- १.११ राष्ट्रिय र अन्तर्राष्ट्रिय महत्वका समसामयिक गतिविधिहरु
- १.१२ लैंगिक समानता, अपाङ्गता तथा सामाजिक समावेशीकरण (GEDSI) सम्बन्धी सामान्य जानकारी

खण्ड-ख (Section - B) : (१० प्रश्न×२ अङ्क = २० अङ्क)

२. सार्वजनिक व्यवस्थापन (Public Management)

(२० अङ्क)

२.१ कार्यालय व्यवस्थापन (Office Management)

- २.१.१ कार्यालय (Office) : परिचय, महत्व, कार्य र प्रकार
- २.१.२ सहायक कर्मचारीका कार्य र गुणहरु
- २.१.३ कार्यालय स्रोत साधन (Office Resources): परिचय र प्रकार
- २.१.४ कार्यालयमा सञ्चारको महत्व, किसिम र साधन
- २.१.५ कार्यालय कार्यविधि (Office Procedure) : पत्र व्यवहार (Correspondence), दर्ता र चलानी (Registration & Dispatch), परिपत्र (Circular), फाइलिङ, तोक आदेश (Order), टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरु

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२.१.६ अभिलेख व्यवस्थापन (Record Management)

२.१.७ सार्वजनिक खरिद व्यवस्थापन (Public Procurement Management) सम्बन्धी
सामान्य जानकारी

२.१.८ कार्यालयमा सूचना प्रविधि (Windows, Word, Excel, PowerPoint, E-Mail, Internet and Social Media) र नवप्रवर्तन (Innovation) सम्बन्धी सामान्य जानकारी

२.२ निजामती सेवा ऐन, गण्डकी प्रदेश निजामती सेवा ऐन, स्थानीय सेवा (गठन तथा सञ्चालन) ऐन र तत् तत् ऐन बमोजिमका नियमावलीहरुमा भएका देहायका व्यवस्थाहरु

२.२.१ सेवाको गठन, संगठन संरचना, पदपूर्ति गर्ने तरिका र प्रक्रियाहरु

२.२.२ कर्मचारीको नियुक्ति, सरुवा, बढुवा, बिदा, विभागीय सजाय र अवकाश

२.२.३ कर्मचारीले पालन गर्नुपर्ने आचरण र कर्तव्यहरु

२.३ मुख्यमन्त्री तथा मन्त्रिपरिषद्को कार्यालय सम्बन्धी जानकारी

२.४ स्थानीय सरकार संचालन ऐन, (संशोधन सहित) २०७४

२.५ भ्रष्टाचार निवारण ऐन, २०५९

२.६ अखिलयार दुरुपयोग अनुसन्धान आयोग, लोक सेवा आयोग र प्रदेश लोक सेवा आयोग सम्बन्धी सामान्य जानकारी

२.७ सरकारी बजेट, लेखा र लेखापरीक्षण प्रणाली सम्बन्धी सामान्य जानकारी

२.८ सार्वजनिक सेवा प्रवाहको अर्थ, सेवा प्रवाह गर्ने निकाय, तरिका र माध्यमहरु

२.९ सार्वजनिक बडापत्र (Public Charter) : महत्व र आवश्यकता

२.१० व्यवस्थापनको अवधारणा तथा सार्वजनिक व्यवस्थापनमा निर्देशन, नियन्त्रण, समन्वय, निर्णय प्रक्रिया, उत्प्रेरणा र नेतृत्व सम्बन्धी जानकारी

२.११ मानवीय मूल्य मान्यता (Human Values), नागरिक कर्तव्य र दायित्व तथा अनुशासन

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भाग (Part II) :-

सेवा सम्बन्धित कार्य-ज्ञान (Job Based - Knowledge)

(३० प्रश्न X २ अङ्क = ६० अङ्क)

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 Theodolite and Traverse surveying

- 1.3.1 Basic difference between different theodolites
- 1.3.2 Temporary adjustments of theodolites
- 1.3.3 Fundamental lines and desired relations
- 1.3.4 Tacheometry: stadia method
- 1.3.5 Trigonometrical levelling
- 1.3.6 Checks in closed traverse
- 1.3.7 Total Station
- 1.3.8 GPS

1.4 Contouring

- 1.4.1 Characteristics of contour lines
- 1.4.2 Method of locating contours
- 1.4.3 Contour plotting

1.5 Drone Surveying

- 1.5.1 Basic concept of drone surveying
- 1.5.2 Contour laying on high resolution picture

1.6 Setting Out

- 1.6.1 Small buildings
- 1.6.2 Simple curves
- 1.6.3 3-4-5 method

1.7 Auto CADD

- 1.7.1 Drawing commands, modify commands, features
- 1.7.2 Application of CADD in Civil Engineering fields
- 1.7.3 Plotting

1.8 Bathymetric survey

2. Mechanics of Materials and Structures

2.1 Mechanics of Materials

- 2.1.1 Internal effects of loading
- 2.1.2 Ultimate strength and working stress of materials

2.2 Mechanics of Beams

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- 2.2.1 Shear force and bending moment
- 2.2.2 Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading
- 2.3 Simple Strut Theory

3. Soil Mechanics

- 3.1 General
 - 3.1.1 Soil types and classification
 - 3.1.2 Three phase system of soil
 - 3.1.3 Unit Weight of soil mass: bulk density, saturated density, submerged density and dry density
 - 3.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index
- 3.2 Compaction of soil
 - 3.2.1 Factors affecting soil compaction
 - 3.2.2 Optimum moisture content
 - 3.2.3 Relation between dry density and moisture content
- 3.3 Shear Strength of Soils
 - 3.3.1 Cohesion and angle of internal friction
 - 3.3.2 Types of retaining wall
 - 3.3.3 Principles of the design of retaining walls
- 3.4 Earth Pressures
 - 3.4.1 Active and passive earth pressures
 - 3.4.2 Lateral earth pressure theory
 - 3.4.3 Rankine's earth pressure theory
- 3.5 Foundation Engineering
 - 3.5.1 Bearing capacity of soil
 - 3.5.2 Terzaghi's general bearing capacity formulas and their application

4. Structural Design

- 4.1 Grade and properties of concrete and steel
- 4.2 R.C. Sections in Bending
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- 4.4 Axially Loaded R.C. Columns
 - 4.4.1 Short and long columns
 - 4.4.2 Design of a rectangular column section
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- 5.1.2 Type and suitability of different foundations: Shallow, deep
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- 5.4.2 Grading of aggregates
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6.2.4 Determination of radius of horizontal curves

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6.4.2 Major pavement types- DBSD, pre-mixed carpeting, asphalt and concrete etc.

6.5 Road Machineries

6.5.1 Earth moving and compacting machines

6.6 Road Construction Technology

6.7 Hill and Mountainous Roads

6.7.1 Special considerations in the design and implementations

6.7.2 Typical cross-section with associated structures

6.8 Road Maintenance and Repair

6.8.1 Type of maintenance Works- routine, periodic, special and emergency

6.8.2 Maintenance of various types of roads

6.9 Highway Materials and Tests

6.10 Road safety

6.11 Provision of road classification, right of way and road safety in the Gandaki Province Road Act, 2081

7. Construction Materials

7.1 Stone

7.1.1 Formation and availability of stones in Nepal

7.1.2 Methods of laying and construction with various stones

7.1.3 Properties of stones

7.2 Cement

7.2.1 Cements: Type, ingredients, properties, manufacture and tests

7.2.2 Storage and transport

7.2.3 Admixtures

7.3 Clay and Clay Products

7.3.1 Brick: type, manufacture, tests, laying, bonds

7.4 Paints and Varnishes

7.4.1 Type and selection

7.4.2 Preparation techniques

7.4.3 Use

7.5 Bitumen

7.5.1 Type

7.5.2 Selection

7.5.3 Use

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8. Hydraulics

8.1 General

8.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity

8.1.2 Pressure and Pascal's law

8.2 Hydro-Kinematics and Hydro-Dynamics

8.2.1 Energy of flowing liquid: Kinetic energy, potential energy, internal energy

8.3 Measurement of Discharge

8.3.1 Weirs and notches

8.3.2 Discharge formulas

8.3.3 Area-velocity method

8.4 Flows

8.4.1 Characteristics of pipe flow and open channel flow with their differences

8.4.2 Darcy-Weisbach equation

9. Estimating and Costing

9.1 General

9.1.1 Main items of work

9.1.2 Units of measurement and payment of various items of work and material

9.1.3 Standard estimate formats of government offices

9.1.4 Method estimate of major building works

9.2 Rate Analysis

9.2.1 Basic general knowledge on the use of rate analysis norms of Government of Nepal and approved district rates

9.2.1 Rate analysis of major building items of works

9.3 Specifications

9.3.1 Specifications of major building works

10. Construction Management

10.1 Organization

10.1.1 Need for organization

10.1.2 Responsibilities of a civil sub-engineer

10.1.3 Relation between Owner, Contractor and Engineer

10.2 Site Management

10.2.1 Preparation of site plan

10.2.2 Organizing labor

10.2.3 Measures to improve labor efficiency

10.2.4 Site safety plan

10.3 Public Procurement Procedure

10.3.1 Contracts

10.3.2 Force account and day- works

10.3.3 Types of Procurements- works, goods, service and others

10.3.4 Procurements methods

10.3.5 Tender and tender notice

10.3.6 Bid security

10.3.7 Preparation before inviting tender

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- 10.3.8 Bid document, bid evaluation
- 10.3.9 General conditions of contract (GCC) and special conditions of contract (SCC)
- 10.3.10 Construction supervision
- 10.3.11 Quality assurance plan and quality control
- 10.3.12 Variations, extension of time, price adjustment escalation and black listing
- 10.4 Accounts
 - 10.4.1 Capacity of Hierarchical Authority for the Approval of Estimate and Bid Price
 - 10.4.2 Familiarity with standard account keeping formats used in governmental organizations
 - 10.4.3 Muster roll
 - 10.4.4 Measurement book (MB)
 - 10.4.5 Work acceptance and work completion report
- 10.5 Planning and Control
 - 10.5.1 Construction schedule
 - 10.5.2 Equipment and materials schedule
 - 10.5.3 Construction stages and operations
 - 10.5.4 Bar chart
 - 10.5.5 As built drawing

11. Water Supply and Sanitation Engineering

- 11.1 General
 - 11.1.1 Status of the irrigation facilities in the Gandaki Province
 - 11.1.2 Objectives of water supply system
 - 11.1.3 Source of water and its selection: gravity and artesian springs, shallow and deep wells; infiltration galleries.
 - 11.1.4 Difference between the gravity, pumping, solar, tube-well water supply system
- 11.2 Gravity Water Supply System
 - 11.2.1 Design period
 - 11.2.2 Determination of daily water demand
 - 11.2.3 Determination of storage tank capacity
 - 11.2.4 Selection of pipe – HDPE, GI, CI, DI, PVC, UPVC, PPR etc.
 - 11.2.5 Pipe line design and hydraulic grade line
 - 11.2.6 Types of gravity flow water system-closed, open, intermittent
 - 11.2.7 Multi-Reservoir system
 - 11.2.9 Intake types- spring, stream
 - 11.2.10 Various types of water supply structures with their functions - intake, collection chamber, BPT, wash-out, air valve, valve chamber, reservoir, division box, tap stand post etc.
 - 11.2.11 Valves and Fittings
- 11.3 Sketch of a rural gravity flow water supply system with various components
- 11.4 Water Quality
 - 11.4.1 Filtration techniques
 - 11.4.2 Safe water standard
- 11.5 Design of Sewer
 - 11.5.1 Quantity of sanitary sewage
 - 11.5.2 Maximum, Minimum and self cleaning velocity
- 11.6 Excreta Disposal and Unsewered Area

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11.6.1 Pit latrine

11.6.2 Design of septic tank

11.7 Brief knowledge of Provincial Water Supply and Sanitation Act, 2079

12. Irrigation Engineering

12.1 General

10.1.1 Status of the irrigation facilities in the Gandaki Province

12.2 Crop Water Requirement

10.2.1 Crop season and crop water requirement for principal crops

10.2.2 Water balance

12.3 Irrigation Canals

12.3.1 Canal losses and their minimization

12.3.2 Maximum and minimum velocities

12.3.3 Design of irrigation canal section using Manning's formula

12.3.4 Need and location of weir/barrage

12.3.5 Head works for small canals

12.4 River training works

12.4.1 Embankment, spur, stud, big boulder riprap, concrete block riprap

12.4.2 Bio engineering works

12.5 Hill Irrigation

12.5.1 Various types of irrigation structures- intake, de-silting/de-sanding basin, aqueduct, super passage, level crossing, siphon, fall, canal protection, division box, outlets etc.

12.5.2 Neat sketch of a hill irrigation system lay-out plan with associated components/structures

12.5.3 Major problems in the hill irrigation system

12.6 Provision of water users association (WUA) and irrigation service fee (ISF) according to the Gandaki Province Irrigation Act, 2078

प्रथम पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरु सोधिने छ ।

| प्रथम पत्र (वस्तुगत) | | | | | |
|----------------------|------|--|---------------------------|---------|-------------------------|
| भाग | खण्ड | विषयवस्तु | परीक्षा प्रणाली | अङ्कभार | प्रश्न संख्या × अङ्क |
| I | (A) | सामान्य ज्ञान (General Awareness) | वहुवैकल्पिक प्रश्न (MCQs) | २० | १० प्रश्न × २ अङ्क = २० |
| | (B) | सार्वजनिक व्यवस्थापन (Public Management) | | २० | १० प्रश्न × २ अङ्क = २० |
| II | - | सेवा सम्बन्धित कार्य-ज्ञान (Job Based -knowledge) | | ६० | ३० प्रश्न × २ अङ्क = ६० |

प्रथम पत्रको भाग (Part II) सेवा सम्बन्धित कार्य-ज्ञान (Job based -knowledge) को पाठ्यक्रमका एकाइबाट परीक्षामा यथासम्भव देहाय बमोजिम प्रश्नहरु सोधिने छ ।

| | | | | | | | | | | | | |
|------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| पाठ्यक्रमका एकाइ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| प्रश्न संख्या | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 |

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द्वितीय पत्र (Paper II) :- सेवा सम्बन्धित कार्य-ज्ञान (Job Based -Knowledge)

खण्ड (Section) (A) : - ५० अङ्क

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 Theodolite and Traverse surveying

- 1.3.1 Basic difference between different theodolites
- 1.3.2 Temporary adjustments of theodolites
- 1.3.3 Fundamental lines and desired relations
- 1.3.4 Tacheometry: stadia method
- 1.3.5 Trigonometrical levelling
- 1.3.6 Checks in closed traverse
- 1.3.7 Total Station
- 1.4.8 GPS

1.4 Contouring

- 1.4.1 Characteristics of contour lines
- 1.4.2 Method of locating contours
- 1.4.3 Contour plotting

1.5 Drone Surveying

- 1.5.1 Basic concept of drone surveying
- 1.5.2 Contour laying on high resolution picture

1.6 Setting Out

- 1.6.1 Small buildings
- 1.6.2 Simple curves
- 1.6.3 3-4-5 method

1.7 Auto CADD

- 1.7.1 Drawing commands, modify commands, features
- 1.7.2 Application of CADD in Civil Engineering fields
- 1.7.3 Plotting

1.8 Bathymetric survey

2. Mechanics of Materials and Structures

2.1 Mechanics of Materials

- 2.1.1 Internal effects of loading
- 2.1.2 Ultimate strength and working stress of materials

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6.6 Road Construction Technology

6.7 Hill and Mountainous Roads

6.7.1 Special considerations in the design and implementations

6.7.2 Typical cross-section with associated structures

6.8 Road Maintenance and Repair

6.8.1 Type of maintenance Works- routine, periodic, special and emergency

6.8.2 Maintenance of various types of roads

6.9 Highway Materials and Tests

6.10 Road safety

6.11 Provision of road classification, right of way and road safety in the Gandaki Province Road Act, 2081

खण्ड (Section) (B) : - ५० अङ्क

7. Construction Materials

7.1 Stone

7.1.1 Formation and availability of stones in Nepal

7.1.2 Methods of laying and construction with various stones

7.1.3 Properties of stones

7.2 Cement

7.2.1 Cements: Type, ingredients, properties, manufacture and tests

7.2.2 Storage and transport

7.2.3 Admixtures

7.3 Clay and Clay Products

7.3.1 Brick: type, manufacture, tests, laying, bonds

7.4 Paints and Varnishes

7.4.1 Type and selection

7.4.2 Preparation techniques

7.4.3 Use

7.5 Bitumen

7.5.1 Type

7.5.2 Selection

7.5.3 Use

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश इन्जिनियरिङ सेवा, सिभिल समूह, जनरल, हाईवे, स्यानिटरी, इरिगेशन, हाइड्रोपावर, हाइड्रोलोजी उपसमूह तथा स्थानीय इन्जिनियरिङ सेवा, सिभिल समूह पाँचौ तहका पदहरुको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

8. Hydraulics

8.1 General

8.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity

8.1.2 Pressure and Pascal's law

8.2 Hydro-Kinematics and Hydro-Dynamics

8.2.1 Energy of flowing liquid: Kinetic energy, potential energy, internal energy

8.3 Measurement of Discharge

8.3.1 Weirs and notches

8.3.2 Discharge formulas

8.3.3 Area-velocity method

8.4 Flows

8.4.1 Characteristics of pipe flow and open channel flow with their differences

8.4.2 Darcy-Weisbach equation

9. Estimating and Costing

9.1 General

9.1.1 Main items of work

9.1.2 Units of measurement and payment of various items of work and material

9.1.3 Standard estimate formats of government offices

9.1.4 Method estimate of major building works

9.2 Rate Analysis

9.2.1 Basic general knowledge on the use of rate analysis norms of Government of Nepal and approved district rates

9.2.1 Rate analysis of major building items of works

9.3 Specifications

9.3.1 Specifications of major building works

10. Construction Management

10.1 Organization

10.1.1 Need for organization

10.1.2 Responsibilities of a civil sub-engineer

10.1.3 Relation between Owner, Contractor and Engineer

10.2 Site Management

10.2.1 Preparation of site plan

10.2.2 Organizing labor

10.2.3 Measures to improve labor efficiency

10.2.4 Site safety plan

10.3 Public Procurement Procedure

10.3.1 Contracts

10.3.2 Force account and day- works

10.3.3 Types of Procurements- works, goods, service and others

10.3.4 Procurements methods

10.3.5 Tender and tender notice

10.3.6 Bid security

10.3.7 Preparation before inviting tender

10.3.8 Bid document, bid evaluation

प्रदेश लोक सेवा आयोग

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10.3.9 General conditions of contract (GCC) and special conditions of contract (SCC)

10.3.10 Construction supervision

10.3.11 Quality assurance plan and quality control

10.3.12 Variations, extension of time, price adjustment escalation and black listing

10.4 Accounts

10.4.1 Capacity of Hierarchical Authority for the Approval of Estimate and Bid Price

10.4.2 Familiarity with standard account keeping formats used in governmental organizations

10.4.3 Muster roll

10.4.4 Measurement book (MB)

10.4.5 Work acceptance and work completion report

10.5 Planning and Control

10.5.1 Construction schedule

10.5.2 Equipment and materials schedule

10.5.3 Construction stages and operations

10.5.4 Bar chart

10.5.5 As built drawing

11. Water Supply and Sanitation Engineering

11.1 General

11.1.1 Status of the irrigation facilities in the Gandaki Province

11.1.2 Objectives of water supply system

11.1.3 Source of water and its selection: gravity and artesian springs, shallow and deep wells; infiltration galleries.

11.1.4 Difference between the gravity, pumping, solar, tube-well water supply system

11.2 Gravity Water Supply System

11.2.1 Design period

11.2.2 Determination of daily water demand

11.2.3 Determination of storage tank capacity

11.2.4 Selection of pipe – HDPE, GI, CI, DI, PVC, UPVC, PPR etc.

11.2.5 Pipe line design and hydraulic grade line

11.2.6 Types of gravity flow water system-closed, open, intermittent

11.2.7 Multi-Reservoir system

11.2.8 Intake types- spring, stream

11.2.9 Various types of water supply structures with their functions - intake, collection chamber, BPT, wash-out, air valve, valve chamber, reservoir, division box, tap stand post etc.

11.2.10 Valves and Fittings

11.3 Sketch of a rural gravity flow water supply system with various components

11.4 Water Quality

11.4.1 Filtration techniques

11.4.2 Safe water standard

11.5 Design of Sewer

11.5.1 Quantity of sanitary sewage

11.5.2 Maximum, Minimum and self cleaning velocity

11.6 Excreta Disposal and Unsewered Area

11.6.1 Pit latrine

प्रदेश लोक सेवा आयोग

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11.6.2 Design of septic tank

11.7 Brief knowledge of Provincial Water Supply and Sanitation Act, 2079

12. Irrigation Engineering

12.1 General

10.1.1 Status of the irrigation facilities in the Gandaki Province

12.2 Crop Water Requirement

10.2.1 Crop season and crop water requirement for principal crops

10.2.2 Water balance

12.3 Irrigation Canals

12.3.1 Canal losses and their minimization

12.3.2 Maximum and minimum velocities

12.3.3 Design of irrigation canal section using Manning's formula

12.3.4 Need and location of weir/barrage

12.3.5 Head works for small canals

12.4 River training works

12.4.1 Embankment, spur, stud, big boulder riprap, concrete block riprap

12.4.2 Bio engineering works

12.5 Hill Irrigation

12.5.1 Various types of irrigation structures- intake, de-silting/de-sanding basin, aqueduct, super passage, level crossing, siphon, fall, canal protection, division box, outlets etc.

12.5.2 Neat sketch of a hill irrigation system lay-out plan with associated components/structures

12.5.3 Major problems in the hill irrigation system

12.6 Provision of water users association (WUA) and irrigation service fee (ISF) according to the Gandaki Province Irrigation Act, 2078

द्वितीय पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

| द्वितीय पत्र (विषयगत) | | | | | | |
|-----------------------|---|------|---------|----------------------------------|-----------------------------------|--|
| पत्र | विषय | खण्ड | अङ्कभार | छोटो उत्तर | लामो उत्तर | |
| द्वितीय | सेवा सम्बन्धित कार्य-ज्ञान (Job Based-Knowledge) | (A) | ५० | ६ प्रश्न \times ५ अङ्क = ३० | २ प्रश्न \times १० अङ्क = २० | |
| | | (B) | ५० | ६ प्रश्न \times ५ अङ्क = ३० | २ प्रश्न \times १० अङ्क = २० | |

| खण्ड | छोटो उत्तर Section A | | | | | | छोटो उत्तर Section B | | | | | | लामो उत्तर | |
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| | | | | | | | | | | | | | A | B |
| पाठ्यक्रमका एकाइ | १ | २ | ३ | ४ | ५ | ६ | ७ | ८ | ९ | १० | ११ | १२ | ५, ६ | ११, १२ |
| प्रश्न संख्या | १ | १ | १ | १ | १ | १ | १ | १ | १ | १ | १ | १ | २ | २ |