प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तरगत इन्जिनियरिङ सेवा, एगृ. इरिगेशन समूह, सातौं तह वा सो सरह पदको खुला, अन्तर तह र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई निम्न अनुसार दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण : लिखित परीक्षा (Written Examination) पूर्णांक : २००

द्वितीय चरण : (क) सामूहिक परीक्षण (Group Test) पूर्णांक : १०

(ख) अन्तरवार्ता (Interview) पूर्णांक : २५

परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा (Written Examination) **पूर्णांक : २००**

पत्र	विषय	खण्ड	पूर्णांक	उत्तीर्णांक	परीक्षा प्रणाली		प्रश्न × अंक	समय
प्रथम	General Subject	**खण्ड (क)** General Awareness & General Reasoning Test	100	40	वस्तुगत (Objective)	(MCQs)	50 × 1	1:30 Hrs
		खण्ड (ख) General Technical Subject					50 × 1	
द्वितीय	Technical Subject		100	40	विषयगत (Subjective)	छोटो उत्तर लामो उत्तर	4 × 5 8 × 10	3 Hrs

द्वितीय चरण : सामूहिक परीक्षण (Group Test) र अन्तरवार्ता (Interview) **पूर्णांक : ३५**

पत्र/विषय	पूर्णांक	उत्तीर्णांक	परीक्षा प्रणाली	समय
सामूहिक परीक्षण (Group Test)	१०	-	सामूहिक छलफल (Group Discussion)	३० मिनेट
अन्तरवार्ता (Interview)	२५	-	मौखिक (Oral)	-

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुन सक्नेछ ।

२. प्रथम पत्र र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

३. वस्तुगत बहुवैकल्पिक प्रश्नहरू (Multiple Choice Questions) को गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अंक कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अंक दिइने छैन र अंक कट्टा पनि गरिने छैन ।

४. बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

५. विषयगत प्रश्नका लागि तोकिएका १० अंकका प्रश्नहरुको हकमा १० अंकको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।

६. द्वितीय पत्रमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तर पुस्तिकाहरू हुनेछन । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तर पुस्तिकामा लेख्नु पर्नेछ ।

७. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।

८. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको सामूहिक परीक्षण र अन्तरवार्तामा सम्मिलित गराइनेछ ।

९. पाठ्यक्रम लागु मिति : २०८१।१२।०६ गते देखि

प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तरगत इन्जिनियरिङ सेवा, एगृ. इरिगेशन समूह, सातौं तह वा सो सरह पदको खुला, अन्तर तह र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रथम चरण : लिखित परीक्षा (Written Examination)

प्रथम पत्र : खण्ड (क)

General Awareness & General Reasoning Test (50 Marks)

1. General Awareness and Contemporary Issues (30 Marks)

1.1. Physical, socio-cultural and economic geography and demography of Nepal
1.2. Major natural resources of Sudurpaschim Province and Nepal
1.3. Geographical diversity, climatic conditions, livelihood & lifestyle of People
1.4. Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
1.5. National and Sudurpashchim Province Current periodic plan
1.6. Information on sustainable development, environment, pollution, climate change, biodiversity, science and technology
1.7. Nepal's international affairs and general information on the UNO, SAARC & BIMSTEC
1.8. The Constitution of Nepal (From Part 1 to 5 and Schedules)
1.9. Governance system and Government (Federal, Provincial and Local)
1.10. Sudurpashchim Province Civil Service Act, 2079 & Regulation, 2081
1.11. Sudurpashchim Province Good Governance Act, 2075
1.12. Local Government Operation Act, 2074
1.13. Functional scope of public services
1.14. Public Service Charter
1.15. Concept, objective and importance of public policy
1.16. Fundamentals of management planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
1.17. Government planning, budgeting and accounting system
1.18. Major events and current affairs of national and international importance

2. General Reasoning Test (20 Marks)

2.1. **Logical Reasoning (7 Marks)**

Verbal Ability, Alphanumeric Series, Reasoning Analogies, Classification, Coding-Decoding, Order & Ranking, Distance & Directions, Analytical and Logical Reasoning, Assertion and Reason, Statement and Conclusion, Input-Output, Venn- diagram

2.2. **Numerical Reasoning (7 Marks)**

Arithmetic Series, Analogy, Classification, Arithmetical Reasoning, Fraction. Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calendar, Data Sufficiency, Data Interpretation & Data Verification

2.3. **Spatial Reasoning (6 Marks)**

Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion, Embedded Images, Image Formation & Analysis, Mirror and Water Images, Cubes and Dices, Paper Folding & Cutting

ΩΩΩ

PSC SUDURPASHCHIM

प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तरगत इन्जिनियरिङ सेवा, एगृ. इरिगेशन समूह, सातौं तह वा सो सरह पदको खुला, अन्तर तह र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रथम पत्र : खण्ड (ख)

General Technical Subject (50 Marks)

1 General Agriculture (5 Marks)

1.1 Agriculture policy and strategy of current agricultural plan of Sudurpashchim Province

1.2 Principles of agronomy (cereals, cash crops, pulses and oilseeds)

1.3 Introduction to horticulture (fruits and vegetables)

1.4 Agro-meteorological data recording, collection and analysis and introduction to sunshine recorder, max and min temperature, wind vane, rain gauges, soil temperature and evaporation pan

1.5 Elements of soil science (soil fertility, physical, chemical and biological properties; measurement and management and classification)

1.6 Mineral and organic sources of fertilizer

1.7 Introduction to plant protection (emphasis on equipment)

1.8 Crop cut survey and data processing

1.9 Elements of farm management

1.10 Introduction to sociology and rural development to Sudurpashchim Province

2 General Engineering

2.1 Mechanical Engineering (7 Marks)

2.1.1 Work, power and energy

2.1.2 Basic knowledge on workshop technology and metallurgy

2.1.3 Fluid mechanics (compressible and incompressible fluids, viscosity, Bernoulli theorem, Archimedes' principle, buoyancy)

2.1.4 Thermodynamics (laws of thermodynamics, Carnot engine, entropy, enthalpy, kinetic theory of gases)

2.1.5 Basic knowledge on thermal energy conversion, fossil fuels and refrigerants

2.1.6 Introduction to theory of machines

2.1.7 Design of machines (machines related to agriculture)

2.1.8 Internal combustion engines (petrol and diesel engines)

2.1.9 Engine terminologies

2.1.10 Cams, gears, flywheel, governor

2.1.11 Failure theories, safety factors and reliability of machine elements

2.1.12 Analysis of machine elements- gears, belt drives, clutches and brakes, bearings, threaded fasteners, riveted and welded joints

2.2 Electrical and Electronics Engineering (3 Marks)

2.2.1 Fundamentals of electricity- current, voltage, resistance, conductance and electrical circuits

2.2.2 Fundamentals of electronics, basic electronic components and circuits

2.2.3 Introduction to computer software and hardware

2.2.4 Basic knowledge on electric machines, transformers, induction motors

2.2.5 Electromagnetic devices and electric power measurements

2.2.6 Single phase and three phase transmission

PSC SUDURPASHCHIM

2.3 Civil Engineering (10 Marks)

2.3.1 Engineering hydrology (hydrological cycle, measurement and analysis of precipitation; measurement, estimation and analysis of runoff, stream flow, evaporation, flood, hydrograph)

2.3.2 Engineering materials (sand, stone, aggregate, brick, cement, steel, timber, paints etc.)

2.3.3 Strength of material/Mechanics of structure (analysis of forces, shear force and bending moment, torque, couple moments, moment of inertia, elasticity, stress and strain, analysis of simply supported beams and columns, impulse, centripetal and centrifugal forces, gravitational laws)

2.3.4 Design of structures (RCC beams, columns, slabs and trusses in steel and timber)

2.3.5 Soil engineering (soil physics, soil mechanics and foundation, engineering properties of soil-stress, strain, compaction, consolidation and settlement, design of shallow foundation)

2.3.6 Surveying (measurement of horizontal and vertical distances, angles and directions, plane table, leveling with different types of equipments, topographic surveying, contouring, job layout) and Drawings- pictorial and isometric drawings

2.3.7 Building construction technology (brick and stone masonry, concreting, damp proof course, floorings, roofing, plastering, carpentry, painting)

2.3.8 Estimating and costing of buildings, irrigation, farm and other agricultural structures.

2.3.9 Open channel hydraulics

2.3.10 Construction management (scheduling and planning, contractual procedure and management, material management, cost and quality control, project management and operation and maintenance)

2.3.11 Concept of benefit cost analysis and financial and economic evaluation.

2.3.12 Design and construction method for land leveling, grading and development

3 Agricultural Engineering

3.1 Soil and Water Engineering (15 Marks)

3.1.1 Soil water retention and movement saturated and unsaturated flow, soil moisture tension, infiltration, permeability, wilting coefficient and hydraulic conductivity

3.1.2 Measurements of irrigation water: velocity- area, flow meter, use of flow measuring devices, weirs, Parshal flumes, cut throat flumes and orifice; tracer method

3.1.3 Soil-water-plant- environment relationship, evaporation, transpiration and consumptive use, estimation of evapo-transpiration (ET) and crop water requirements

3.1.4 Water requirement, irrigation frequencies, depth of water to be applied during irrigation, irrigation efficiencies, bases of irrigation scheduling

3.1.5 Irrigation methods and hydraulics: furrow irrigation, border irrigation and check basin irrigation; methods to reduce water losses in irrigation system

3.1.6 Sprinkler and drip/trickle Irrigation

3.1.7 Type of drainage systems, surface and sub surface drainage systems, survey and design of drainage systems

3.1.8 Ground water formation and aquifer characteristics, hydraulics of wells, exploration of ground water, kinds of tube-wells; design, estimate and construction of wells; water lifting devices and irrigation pumps, their selection, power requirements and economy.

3.1.9 Mechanics and causes of different forms of soil erosion (rain drop erosion, sheet erosion, rill erosion, gully erosion, stream channel erosion)

PSC SUDURPASCHIM

3.1.10 Assessment and estimation of soil erosion rates
3.1.11 Measures of soil conservation biological and cultural, mechanical and structural
3.1.12 Specialized forms of erosion and land degradation landslide and mass wasting debris flow, landslide and mass wasting
3.1.13 Gully control: planning to control gully erosion, general requirements of gully control structures, permanent and temporary gully control structures; design, construction and maintenance of diversion of run-off
3.1.14 Concepts of Watershed Management

3.2 Farm Power and Machinery (5 Marks)

3.2.1 Sources of farm power- human, animal, mechanical, electrical
3.2.2 Non-conventional energy sources - biomass energy solar, wind, micro hydro and
3.2.3 Tillage requirement and draft power requirements
3.2.4 Tillage and land preparation machinery- sliding and rolling bottom ploughs, rotary tillers, forces on sliding and rolling cutting tools
3.2.5 Seeding and planting machines and sowing methods of major crops
3.2.6 Machines and equipments for crop intercultural operations
3.2.7 Plant protection equipments- sprayers and dusters
3.2.8 Harvesting and threshing equipments
3.2.9 Power transmission system and devices (belt, chain, shaft, pulley etc.)
3.2.10 Measurements of power requirements of farm implements

3.3 Agricultural Processing (1 Marks)

3.3.1 Properties of solid, liquid and powder food products; grain drying theory, Grain pressure theory
3.3.2 Unit operations in processing of cereals, pulses and oilseed ding. Sorting, drying, milling and storage
3.3.3 Unit operations in processing fruits and vegetables - factors of deterioration, water and water activity; preservation- by drying and dehydration, by concentration, by irradiation and by freeze drying

3.4 Farm Structures (1 Marks)

3.4.1 Animal housing dairy, poultry, swine, sheep and goat
3.4.2 Farm roads
3.4.3 Farm fencing
3.4.4 Farm ponds and aquaculture ponds
3.4.5 Green houses

3.5 Rural Energy (3 Marks)

3.5.1 Major sources of renewable and non-renewable energy in agricultural and rural development
3.5.2 Active and passive use of solar energy
3.5.3 Biomass energy and biogas reactors
3.5.4 Wind energy harnessing
3.5.5 Micro-hydropower generation and utilization

ΩΩΩ

PSC SUDURPASHCHIM

प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तरगत इन्जिनियरिङ सेवा, एगृ. इरिगेशन समूह, सातौं तह वा सो सरह पदको खुला, अन्तर तह र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र : Technical Subject

Section (A) – 30 Marks

1. Water Resources and Irrigation (10 Marks)

1.1. Water resources strategy, development and management, potentials for irrigation in Sudurpashchim Province and Nepal.

1.2. Sudurpaschim Province current plan, policy and regulations in irrigation development and management.

1.3. Definition and function of irrigation and its advantages

1.4. Status of irrigation development in Sudurpashchim Province and Nepal

2. Irrigation and Drainage Engineering

2.1. **Planning Canal Irrigation Schemes (10 Marks)**

2.1.1. Soil moisture and crop relationships

2.1.1.1. General classification of soil for agricultural purpose

2.1.1.2. Soil moisture and crop water requirement

2.1.1.3. Factors affecting crop water requirement

2.1.1.4. Crop water requirement calculation by Penman method

2.1.1.5. Principal crops, their seasons and their water requirement

2.1.2. Estimation of water requirements of selected command area

2.1.3. Considerations in canal alignment and layout.

2.1.4. Irrigation duty, delta, base period, kor depth

2.1.5. Classification of canals according to function; types of permanent and inundation canals

2.1.6. Components of the canal system, major canal, branch canal, distributaries and water courses

2.2. **Design of Water Conveyance and Control (10 Marks)**

2.2.1. Design of open channels

2.2.2. Design of underground pipe conveyance system

2.2.3. Structures for water control, distribution and cross-drainage

2.2.4. Design of lined channels, lining materials and economics of lining

2.2.5. Specific design considerations for hilly and Terai irrigation canals

Section (B) -30 Marks

2.3. **On-Farm Water Management (10 Marks)**

2.3.1. Farm irrigation requirements

2.3.2. Soil, plant, climatic factors affecting irrigation scheduling

2.3.3. Methods of applying water in irrigation fields: surface, subsurface and sprinkler

2.3.4. Planning farm irrigation delivery

2.3.5. Hydraulics of gravity irrigation methods- check basin, border, strip and furrow

2.3.6. Hydraulics of pressurized irrigation methods sprinkler and drip Irrigation

2.3.7. Land development, grading and leveling

PSC SUDURPASHCHIM

2.4. **Development and Management of Ground Water and Water Lifting Devices (10 Marks)**

- 2.4.1. Ground water exploration -Recharge Vs Exploration
- 2.4.2. Aquifer characteristics and ground water yield
- 2.4.3. Design of wells
- 2.4.4. Tube-well drilling and well development
- 2.4.5. Pump classification
- 2.4.6. Reciprocating, centrifugal, turbine, submersible and propeller pumps
- 2.4.7. Pumps for small scale irrigation- hydraulic ram, treadle pump
- 2.4.8. Selection of pumps and basic consideration of the design of lift irrigation.

2.5. **Planning and Management of Irrigation System (10 Marks)**

- 2.5.1. General irrigation system planning
- 2.5.2. Distribution system: water management and its control; different types of canal outlets and their design considerations
- 2.5.3. Organization and irrigation management
- 2.5.4. Development of a small scale irrigation project
- 2.5.5. Participatory irrigation management
- 2.5.6. Operation and maintenance of irrigation systems
- 2.5.7. Institutional and governance aspects of irrigation system management

Section (C) -20 Marks

3. Soil and Water Conservation Engineering

3.1. **Mechanics of Soil Erosion and Measures for Soil Erosion Control (10 Marks)**

- 3.1.1. Mechanics of water and wind erosion
- 3.1.2. Forms of soil erosion and their investigation
- 3.1.3. Causes and mechanics of debris flows and landslides
- 3.1.4. Soil loss measurement and monitoring- sediment sampling, erosion plot studies, peer catchment's studies
- 3.1.5. Biological and cultural measures
- 3.1.6. Mechanical measures-terracing, vegetated waterways
- 3.1.7. Structural measures- Check-dams for gully control, stream-bank erosion control structures.
- 3.1.8. Bio-engineering measures

3.2. **Water Induced Disaster and Mitigation, Specialized Soil and Water Conservation Activities and Watershed Management (10 Marks)**

- 3.2.1. Risk, hazard and vulnerability
- 3.2.2. Debris flows, landslides and their control
- 3.2.3. Stages of rivers and their meandering process; river training and its necessity
- 3.2.4. Methods of river training and their designs
- 3.2.5. Effects of degradation on river structures
- 3.2.6. Flood control and its necessity, methods of flood control and their designs
- 3.2.7. Soil and water management in water deficit areas

PSC STUDY PASHCHIM

3.2.8. Systems of water harvesting and recycling
3.2.9. Design of farm ponds
3.2.10. Control and rehabilitation of debris flows, landslides and landslips
3.2.11. Control of mining erosion
3.2.12. Control of roadside erosion
3.2.13. Morphological parameters of watershed
3.2.14. Hydro-meteorological parameters affecting water and sediment yields and their gauging
3.2.15. Investigation and prioritization of watersheds
3.2.16. Remote sensing techniques for evaluation of watershed based natural resources
3.2.17. Development of coherent watershed management plan

Section (D) -20 Marks

4. Farm Power and Machinery and Heavy Equipment (10 Marks)

4.1. **Farm Power Sources**

4.1.1. Human, animal, mechanical and electrical power sources in agriculture
4.1.2. Animal power hamesses
4.1.3. Farm tractors
4.1.4. Internal combustion engines
4.1.5. Non-conventional energy use in agriculture

4.2. **Farm Machines and Equipments: Mechanism and Management**

4.2.1. Tillage implements
4.2.2. Equipments for seeding, planting and transplanting
4.2.3. Machines and equipments for weeding and intercultural operations
4.2.4. Equipments for plant protection
4.2.5. Harvesting equipments for cereals, roots and tubers
4.2.6. Equipments for threshing and pre-Processing
4.2.7. Irrigation equipments
4.2.8. Machines and equipments for land development
4.2.9. Cost of operation and maintenance of farm machines and equipments.
4.2.10. Selection of farm machines

4.3. **Introduction to Heavy Equipment**

4.3.1. Bulldozer, Wheel loader, Excavator, Dragline, Grader, Static roller & Vibration roller, Truck and their applications
4.3.2. Calculation of production work done by the above equipments, estimation of expenditure incurred/hour to run the above equipments and operation, maintenance system and safety measures

5. Farm and Rural Infrastructure and Energy in Irrigation Command (10 Marks)

5.1. **Farm Structures**

5.1.1. Planning, layout and functional requirements of various farm housings, shelters and storage structures, green house and poly house
5.1.2. Environmental control

PPSC SUDURPASHCHIM

5.2. **Structures for Fishery and Aquaculture**

5.2.1. Design, layout and functional requirements of fish ponds
5.2.2. Functional requirements of hatchery for fish breeding
5.2.3. Equipments and facilities for commercial fish farming

5.3. **Rural Roads**

5.3.1. Approach to rural road planning
5.3.2. Geometries in the designs of rural roads
5.3.3. Structures for cross-drainage and roadside erosion control

5.4. **Rural Water Supply and Sanitation**

5.4.1. Approach to planning rural water supply scheme and quality considerations
5.4.2. Structures for intake, storage and distribution systems
5.4.3. Pipe and pipe fittings in water distribution system
5.4.4. Design and construction of Ferro-cement, masonry and RCC tanks
5.4.5. Solid waste disposal by land filling and composting
5.4.6. Design of pit latrine, septic tanks and soak pits

5.5. **Suspended and trail Bridges**

5.6. **Rural Energy**

5.6.1. Sources of energy and their classification
5.6.2. Rural and urban energy consumption pattern in Sudurpaschim Province and Nepal
5.6.3. Active and passive use of solar energy in agriculture and conversion devices
5.6.4. Energy from biomass: biomass gasification, anaerobic digestion of biomass
5.6.5. Wind energy harnessing system
5.6.6. Operation and management of micro-hydroelectric systems in Nepal
5.6.7. Planning, installation, operation and management of rural electrical system
5.6.8. Energy auditing and development for rural development

ΩΩΩ

द्वितीय चरण (Second Phase) : सामूहिक परीक्षण (Group Test) र अन्तरवार्ता (Interview)

सामूहिक परीक्षण (Group Test) **(१० अंक)**

सामूहिक छलफल (Group Discussion)

यस प्रयोजनको लागि गरिने परीक्षण १० पूर्णाङ्क र ३० मिनेट अवधिको हुनेछ, जुन नेता विहिन सामूहिक छलफल (Leaderless Group Discussion) को रुपमा अवलम्बन गरिने छ। दिइएको प्रश्न वा Topic का विषयमा पालैपालोसंग निर्दिष्ट समय भित्र समूह बीच छलफल गर्दै प्रत्येक उम्मेदवारले व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ।

सामूहिक छलफलमा दिइने नमुना प्रश्न वा Topic

उदाहरणको लागि - उर्जा संकट, गरीबी निवारण, बाली बीमा, सामाजिक सुरक्षा, खाद्य सुरक्षा, प्रतिभा पलायन, स्वास्थ्य बीमा, जलवायु परिवर्तन, आरक्षण जस्ता समसामयिक विषयवस्तुहरुबाट कुनै एक Topic दिइनेछ |

अन्तरवार्ता (Interview) **(२५ अंक)**

मौखिक (Oral)

ΩΩ THE END ΩΩ

PSC SUDURPASHCHIM