लोक सेवा आयोग

नेपाल इञ्जिनियरिङ्ग सेवा, एगृ इरिगेशन समूह, राजपत्राङ्कित तृतीय श्रेणीका पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :–	लिखित परीक्षा (Written Examination)	पूर्णाङ्क :– २००
द्वितीय चरण :-	(क) सामूहिक परीक्षण (Group Test)	पूर्णाङ्क :– १०
	(ख) अन्तर्वार्ता (Interview)	पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा (Written Examination) **पूर्णाङ्क :– २००**

पत्र	विषय	खण्ड	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या ×अङ्क	समय
प्रथम	General Subject	Part I: General Awareness & General Reasoning Test	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	५० प्रश्न × १ अङ्क	१ घण्टा ३० मिनेट
		Part II: General Technical Subject					५० प्रश्न × १ अङ्क	
द्वितीय	Technical Subject		१००	४०	विषयगत (Subjective)	छोटो उत्तर लामो उत्तर	४ प्रश्न × ५ अङ्क ८ प्रश्न × १०अङ्क	३ घण्टा

द्वितीय चरण : सामूहिक परीक्षण (Group Test) र अन्तर्वार्ता (Interview) **पूर्णाङ्क :– ४०**

पत्र /विषय	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली	समय
सामूहिक परीक्षण (Group Test)	१०		सामूहिक छलफल (Group Discussion)	३० मिनेट
अन्तर्वार्ता (Interview)	३०		बोर्ड अन्तर्वार्ता(Board Interview)	-

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

२. प्रथमपत्र र द्वितीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

३. 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 ।

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

५. विषयगत प्रश्नहरुको हकमा तोकिएको 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 टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

६. द्वितीय पत्रमा (विषयगत प्रश्न हुनेका हकमा) प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

७. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/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 पाठ्क्रममा परेको सम्झनु पर्दछ ।

८. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

९. यस भन्दा अगाडि लागु भएका माथि उल्लेखित सेवा, समूहको पाठ्यक्रम खारेज गरिएको छ ।

१०. पाठ्यक्रम लागू मिति : - २०८०/०७/२०

प्रथम पत्र (Paper I): General Subject

Part (I) : - General Awareness & General Ability Test (50 Marks)

1. **General Awareness and Contemporary Issues (25 ×1 Mark = 25 Marks)**
   - 1.1 Physical, socio-cultural and economic geography and demography of Nepal
   - 1.2 Major natural resources of Nepal
   - 1.3 Geographical diversity, climatic conditions, and livelihood & lifestyle of people
   - 1.4 Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
   - 1.5 Current periodical plan of Nepal
   - 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 Provisions of civil service act and regulation relating to constitution of civil service, organisational structure, posts of service, fulfillment of vacancy and code of conduct
   - 1.11 Functional scope of public services
   - 1.12 Public Service Charter
   - 1.13 Concept, objective and importance of public policy
   - 1.14 Fundamentals of management : planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
   - 1.15 Government planning, budgeting and accounting system
   - 1.16 Major events and current affairs of national and international importance

2. **General Reasoning Test (25 ×1 Mark = 25 Marks)**

   2.1 **Logical Reasoning** (9×1 Mark = 9 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** (8×1 Mark = 8 Marks)
   Arithmetic Series, Analogy, Classification, Arithmetical Reasoning, Fraction. Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calender, Data Sufficiency, Data Interpretation & Data Verification

   2.3 **Spatial Reasoning** (8×1 Mark = 8 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

Part (II) : - General Technical Subject (50 Marks)

1. General Agriculture 10%

1.1 Agriculture policy and strategy of Nepal
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

2. General Engineering 40 %

2.1 Mechanical Engineering (14%)

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 (6%)

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

2.3 Civil Engineering (20%)

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 50%

3.1 Soil and Water Engineering (30%)

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)

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 – 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 (10%)

3.2.1 Sources of farm power- human, animal, mechanical, electrical

3.2.2 Non -conventional energy sources – solar, wind, micro – hydro and biomass energy

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 (2%)

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 (2%)

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 (6%)

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