लोक सेवा आयोग

नेपाल इन्जिनियरिङ्ग सेवा, एगृ इरिगेसन इन्जिनियरिङ्ग समूह, रा.प.द्वि.श्रेणी, खुला र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्र : सेवा सम्वन्धी प्राविधिक विषय पूर्णाङ्क : १००

1. General Agriculture

1.1 Principles of agronomy (cereals, cash crops, pulses and oilseeds)
1.2 Elements of soil science (soil fertility and soil properties)
1.3 Crop cut survey and data processing
1.4 Crop diversifications and agriculture commercialization
1.5 Soil Plants & water relationships

2. Water Resources and Irrigation in Nepal

2.1 Water resources potential and perspective
2.2 Irrigation potential and scope
2.3 Irrigation project planning
2.4 Importance and use of hydro-meteorological and climatic data, soil and moisture data, and socio-economic data
2.5 Participatory approach

3. Planning, Development and Management of Irrigation System

3.1 Development of a small and medium scale irrigation projects
3.2 Development and management of micro-irrigation systems
3.3 Feasibility studies and investigations
3.4 General irrigation system planning
3.5 Distribution system: water management and its control, different types of canal outlets and their design considerations
3.6 Farm and rural infrastructure
3.7 Farm power

4. Irrigation and Drainage Engineering Design

4.1 Irrigation water requirements
4.2 Water availability and water balance
4.3 Design considerations of irrigation system: head works, canals, underground pipe conveyance, cross drainage works, water control and regulating structures, farm distributaries and water courses
4.4 Specific features in designing irrigation and drainage systems in terai, hills and mountains
4.5 Design of farm drainage system and drainage structures
4.6 Environmental issues, Initial Environmental Examination, Environmental Impact Assessment and Environmental Protection Measures
4.7 Low cost techniques

5. Groundwater Development and Management

5.1 Groundwater potential in Nepal
5.2 Groundwater exploration
5.3 Design of shallow and deep tube wells
5.4 Tube well drilling and development
5.5 Selection of various kinds of pumps
5.6 Conjunctive use
5.7 Operation and maintenance of tube wells and pumps

6. On-Farm Irrigation System Design and Water Management

6.1 Farm irrigation water requirements, distribution efficiencies and irrigation scheduling
6.2 Irrigation methods, hydraulics of gravity and pressurized irrigation methods, and planning for farm irrigation delivery

6.3 On-farm water management
6.4 Land development, consolidation and grading
6.5 Integrated crop water management
6.6 Use of appropriate farm implements, Farm power machines and equipments, and their management in irrigated agriculture

7. Construction Management and Quality Control of Irrigation Systems

7.1 Construction technology and management
7.2 Implementation schedule
7.3 Contract management
7.4 Quality control

8. Irrigation System Management

8.1 Concepts of irrigation system management
8.2 Operation, regulation and maintenance of headwork, control gates and canal systems
8.3 Participatory irrigation management and stakeholders' involvement
8.4 Joint management
8.5 Irrigation management transfer: strategies, process and outcomes
8.6 Public-private partnership in irrigation system management
8.7 Institutional development in irrigation system
8.8 Irrigation system performance

9. Water Induced Disaster Mitigation

9.1 Water induced hazards, vulnerability and disasters
9.2 Causes of occurrence of landslides, debris flows and floods; their mitigation and prevention measures
9.3 Design of various structural and bio-engineering measures
9.4 Inundation problems in Nepal and attempts for their solution
9.5 River and flood plain management

10. Soil and Water Conservation, and Watershed Management

10.1 Soil erosion problems in Nepal and their effects on irrigated agriculture
10.2 Soil and water conservation measures (structural and non-structural) in the irrigation system
10.3 Importance of watershed management with respect to the development and sustainability of irrigated agriculture
10.4 Prioritization of watersheds

11. Economics, Resource Mobilization and Management

11.1 Economics of irrigation
11.2 Estimating and costing
11.3 Economic analysis of irrigation projects
11.4 Resource mobilization
11.5 Contract dispute, negotiation and resolution
11.6 Monitoring and evaluation

12. Implementation and Policy Issues

12.1 Involvement of NGOs in irrigation
12.2 National policies and effectiveness in implementation

_____00_____

लोक सेवा आयोग

नेपाल इन्जिनियरिङ्ग सेवा, एगृ इरिगेसन इन्जिनियरिङ्ग समूह, रा.प.द्वि.श्रेणी, खुला र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

Model Questions

Analytical Review: 4 Questions 4*15= 60 Marks

1. Explain the importance of the physical properties of soil. What makes the interest of Irrigation Engineers in the properties if soil? Describe Sieve Analysis Method for Grain size distribution. What are the effects of grain size upon the physical properties of soil? What are the uses of grain size distribution?

2. In a run-off-the river irrigation scheme, draw a schematic layout of a typical canal system indicating barrage or weir, main canal, branch canal, distributary channels, and field channels (water courses). Define intensity of irrigation; and explain its importance in the overall planning of a new irrigation project. What factors effect on the determination of intensity of irrigation?

3. What is water-induced disaster? Explain how the disaster relates with hazards and vulnerability. How a disaster may be categorized in terms of size and level? For risk assessment what other assessments are considered? Suggest what major activities are comprised under Pre-disaster management activities; describe one of them in detail.

4. What is agricultural drainage? What are the effects and causes of water logging in the agricultural land? What approach need to be taken for the solution to drainage problems in a farm land? Explain the functional parts of a surface drainage system. In a surface drainage system in flat areas having less than 2 percent slope, suggest the types of drainage systems that may be used in an agricultural area; and describe one of them in detail.

Analytical and problem solving: 2 Questions 2*20= 40 Marks

1. Define Evapo-transpiration. What factors effect most in the process of evapo-transpiration? What role do the stages of growth of crop influence on the consumptive use rate? Explain the situation of consumptive use at different stages.
   A farmer having 10 ha of land grows wheat in 5 ha, potato in 3 ha and mustard in 2 ha during Rabi season of 4 months. Water requirement of wheat is 45 cm, potato 50 cm and mustard 10 cm. What size of irrigation stream will be required for a source which can supply for 8 hours each day during the season?

2. Define a centrifugal pump. Why are such pumps mostly used in irrigation practice? Describe: (a) the principle of operation of centrifugal pumps, (b) operation and maintenance of centrifugal pumps.
   A farmer wishes to have his own pump-set for the following cropping pattern to be followed in his farm of 5 ha. Calculate the appropriate size of the centrifugal pump that he should have.

Season	Crop	Area to be irrigated (ha)	Intensity of irrigation (cm)	Rotation period (days)	Period of work (hours/day)
Rabi	Wheat	2.0	7.5	12	10
	Cotton	0.4	7.5	20	10
	Vegetables	0.4	7.5	10	10
	Mustard	2.2	5.0	40	10