

# प्रदेश लोक सेवा आयोग

## गण्डकी प्रदेश

इन्जिनियरिङ्ग सेवा, सिभिल समूह, इरिगेशन उपसमूह, अधिकृत नवौं तहका पदको खुला, अन्तरतह र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

### द्वितीय पत्र - सेवा सम्बन्धी प्राविधिक विषय

पूर्णाङ्क:— १००

#### 1. Introduction

- 1.1. Irrigation development in Nepal
- 1.2. Irrigation project planning including multipurpose projects
- 1.3. Participatory approach in irrigation development
- 1.4. Feasibility studies and investigations
- 1.5. Water Resources Potential and Perspective
- 1.6. Irrigation development in Gandaki province
- 1.7. Major irrigation projects in Gandaki province
- 1.8. Current issues and problems in irrigation projects

#### 2. Irrigation Design

- 2.1. Irrigation water requirement
- 2.2. Water availability and water balance
- 2.3. Design and design considerations of irrigation system – head works, canals, cross drainage works, water regulating structures, Farm drainage and drainage structures, specific features in designing irrigation systems in hills and mountains
- 2.4. Design considerations for lift irrigation system
- 2.5. Climate change impacts on demand and supply sides of irrigation system
- 2.6. Environmental issues in irrigation design, policy provisions for Initial Environmental Examination and Environmental Impact Assessment;

#### 3. Ground water Development

- 3.1. Overview of ground water potential in Nepal and Gandaki Province
- 3.2. Ground water exploration
- 3.3. Design of water wells – deep, shallow and other low cost techniques
- 3.4. Well construction and development
- 3.5. Conjunctive use
- 3.6. Issues in groundwater irrigation project development and management

#### 4. Water Induced Disaster

- 4.1. Types of Water Induced disaster and Vulnerability
- 4.2. Floods, causes of occurrence, and mitigation measures
- 4.3. Preventive measures for water induced disaster
- 4.4. Inundation Problem in Nepal and Gandaki Province
- 4.5. Possibility of Glacial Lake Outburst Flood in Gandaki province
- 4.6. Concept of bio-engineering and nature based solutions in water induced disaster
- 4.7. Climate change impacts on water-induced disaster

#### 5. River Engineering

- 5.1. River and flood plain management
- 5.2. River Hydraulic and sediments transports

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- 5.3. River channel improvement and flood control design planning
- 5.4. Design of flood control works viz. longitudinal and transverse dikes, bed bars, cut-offs, etc.
- 5.5. Design Considerations of river structure in climate change context

### **6. Construction of Irrigation Projects**

- 6.1. Method and construction technology
- 6.2. Contract management and quality aspects of construction
- 6.3. Environmental protection issues in developing irrigation systems
- 6.4. Participatory approach in the construction of irrigation projects

### **7. Quality assurance plan and quality control Irrigation Management and Sustainability**

- 7.1. General concepts of irrigation management
- 7.2. System operation and maintenance
- 7.3. Operation / regulation of head works
- 7.4. Types of irrigation system with respect to their management & performance
- 7.5. Participatory irrigation management and stakeholders involvement
- 7.6. Joint management concept and sustainability issues
- 7.7. Irrigation Management transfer, process and outcome of management transfer, Private sector management of irrigation
- 7.8. Role of Water User's Association for sustainability of irrigation system
- 7.9. Fundamental concept on Irrigation service fee
- 7.10. Asset management in irrigation system

### **8. Economics, Resource Mobilization and Administration**

- 8.1. Economics of irrigation
- 8.2. Resource Mobilization in Irrigation Sector
- 8.3. Economic analysis of irrigation projects
- 8.4. Institutional strengthening
- 8.5. Contract Dispute resolution

### **9. Implementation and Policy Issues**

- 9.1. National and provincial Policies and effectiveness in implementation
- 9.2. Involvement of NGOs in Irrigation
- 9.3. Development of Non-conventional irrigation systems
- 9.4. Integrated approach of crop water management

### **10. Environmental Assessment.**

- 10.1. Concept of environmental assessment, Brief environmental study (BES), Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA), role of EIA, EIA principles, type and impacts
- 10.2. Screening, Scooping, Initial Impact Identification, TOR preparation, EIA Report Writing

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10.3. Management of BES/IEE/EIA process: Public Participation, EIA review, mitigation measures, Monitoring and Environmental Management Plan

10.4. Environmental Auditing

10.5. Relationship between infrastructure development, environment and climate change

10.6. Environmental and social Impact assessment in water resource sector and its mitigation.

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