

हाइड्रोइलेक्ट्रिसिटी इन्भेष्टमेन्ट तथा डेभलपमेन्ट कम्पनी लिमिटेड
प्राविधिक सेवा, इन्जिनियरिङ्ग समूह, १० तह, प्रमुख प्रबन्धक (हाइड्रोपावर) खुला तथा आन्तरिक प्रतियोगितात्मक
परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :-	लिखित परीक्षा	पूर्णाङ्क :- २००
द्वितीय चरण :-	(क) प्रस्तुतिकरण	पूर्णाङ्क :- २०
	(ख) अन्तर्वार्ता	पूर्णाङ्क :- ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा

पूर्णाङ्क :- २००

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या × अङ्क	समय
प्रथम	Governance, Management & Institution Related	१००	४०	विषयगत - छोटो उत्तर आउने प्रश्न	८ प्रश्न × ५ अङ्क	३ घण्टा
				विषयगत - तर्कयुक्त विश्लेषणात्मक प्रश्न	६ प्रश्न × १० अङ्क	
द्वितीय	Service Specific	१००	४०	विषयगत - तर्कयुक्त विश्लेषणात्मक प्रश्न	२ प्रश्न × १० अङ्क = २०	३ घण्टा
				विषयगत - समस्या समाधानमुलक प्रश्न	४ प्रश्न × २० अङ्क = ८०	

२. द्वितीय चरण : प्रस्तुतिकरण र अन्तर्वार्ता

पूर्णाङ्क :- ५०

विषय	पूर्णाङ्क	परीक्षा प्रणाली
प्रस्तुतिकरण	२०	व्यक्तिगत प्रस्तुतिकरण
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र /विषयमा दिईए अनुसार हुनेछ ।
- विषयगत प्रश्नको हकमा एउटै प्रश्नका दुई वा दुईभन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । उम्मेदवारले प्रत्येक खण्डका प्रश्नको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम स्वीकृत मिति : २०८१/१०/२१

प्रथम पत्र - Governance, Management & Institution Related

खण्ड (क) - ५० अङ्क

(४ प्रश्न × ५ अङ्क र ३ प्रश्न × १० अङ्क)

1. Governance (10 Marks)

- 1.1 The constitution of Nepal (parts 1, 3, 4 & 5, and schedules)
- 1.2 Governance : definition, functions, principles and characteristics
- 1.3 Corporate governance system: meaning, stages, principles, characteristics
- 1.4 Government's financial administration in general: concept, scope, functions and objectives, and the laws related to that, particularly, Financial Procedures and Fiscal Responsibility Act, 2076 and Financial Procedures and Fiscal Responsibility Rules, 2077
- 1.5 Ethics: essence, determinants, consequences and dimensions of ethics; ethics in public service, Code of ethics in engineering profession

2. Project and Contract Management (20 Marks)

- 2.1 Project planning and scheduling: process and importance of project scheduling, work breakdown structure, bar chart, network analysis, program evaluation and review technique (PERT), critical path method (CPM), introduction to Primavera
- 2.2 Project implementation: project organization, resource allocation and mobilization
- 2.3 Project monitoring, control and evaluation: supervision and monitoring, project control (time, cost and quality), S-curve, earned value analysis, quality assurance (QA), total quality management (TQM), specifications and its importance in quality assurance, technical auditing (validation, verification, precision, accuracy and tolerance)
- 2.4 Familiarization with World Bank & Asian Development Bank processes of public procurement
- 2.5 Preparation of contract documents, specifications, conditions of contract and other contractual procedures
- 2.6 Types of contracts and their relevance in hydropower projects, Standard Bidding Document for ICB including for EPC contract, Standard Bidding Document for NCB including for EPC contract
- 2.7 Bid evaluation and contract award
- 2.8 Contractual disputes and their resolution (mediation, arbitration and negotiation)
- 2.9 Public procurement under Public Procurement Act, 2063, Public Procurement Regulation, 2064 and guidelines of PPMO Nepal

3. Relevant Policies and Laws (20 Marks)

- 3.1 National Water Resources Policy, 2077
- 3.2 Hydropower Development Policy, 2001
- 3.3 Water Resources Strategy, 2002
- 3.4 National Energy Strategy of Nepal, 2013
- 3.5 Nepal Engineering Council Act, 2055 and Nepal Engineering Council Rules, 2057
- 3.6 Water Resources Act, 2049 and Water Resources Rules, 2050

- 3.7 Electricity Act, 1992, Electricity Rules, 1993 and Nepal Electricity Grid Code, 2080
- 3.8 Electricity Regulation Commission Act, 2074 and Electricity Regulatory Commission Rules, 2075
- 3.9 Foreign Investment and Technology Transfer Act, 2075
- 3.10 Land Acquisition Act, 2034
- 3.11 Industrial Enterprises Act, 2076
- 3.12 Public Private Partnership and Investment Act, 2075
- 3.13 Environment Protection Act, 2076 and Environment Protection Regulation, 2077

खण्ड (ख) - ५० अङ्क

(४ प्रश्न × ५ अङ्क र ३ प्रश्न × १० अङ्क)

- 4. **Institution Building and Aspects of Institutional Management (10 Marks)**
 - 4.1 Institution building: definition, objectives, organization versus institution, influencing factors of institution building
 - 4.2 Institutional management: concept, principles, scope, functions and characteristics
 - 4.3 Leadership, motivation and group dynamics
 - 4.4 Management skills: decision making, problem solving and communication
 - 4.5 Human resource management: acquisition, development, utilization and maintenance
 - 4.6 Management information system
- 5. **Power Sector Institutions in Nepal: History and Current Trend (10 Marks)**
 - 5.1 History of power sector and its institutional development in Nepal
 - 5.2 Global changing trend in power sector development
 - 5.3 Public versus private sector: roles and participation in Nepal
 - 5.4 Concept and trend of power sector reform; and helping and hindering factors in power sector reform in Nepal
 - 5.5 Positive and negative aspects of Nepal's current power sector: critical review
- 6. **Water and Power Sector Institutions (10 Marks)**

Organization and functioning of:

 - 6.1 GoN institutions: National Water Resources Council, National Planning Commission, Ministry of Energy, Water Resources and Irrigation, Department of Electricity Development
 - 6.2 Regulatory institutions: Electricity Regulatory Commission, Water and Energy Commission and its Secretariat
 - 6.3 Power sector business institutions: power utility (Nepal Electricity Authority) and other off-takers, Rastriya Prasaran Grid Company Limited, Load Dispatch Center/System Operator, power related business companies (generation, transmission, distribution and trading), investors, multilateral development partners, guarantors, lenders, construction and O & M contractors, insurers, etc.

7. Hydroelectricity Investment and Development Company Limited (20 Marks)

- 7.1 Hydroelectricity Investment and Development Company Limited (HIDCL):
Introduction, organizational structure, functions, present status, opportunities and challenges
- 7.2 Memorandum of Association and Article of Association of HIDCL, 2068
- 7.3 Employee Service Bylaws of HIDCL, 2068
- 7.4 Financial Administration and Procurement Bylaws of HIDCL
- 7.5 Debt and Equity Investment Procedure, 2078
- 7.6 Strategic Plan of HIDCL
- 7.7 Corporate Social Responsibility Standard of HIDCL
- 7.8 Internal Control System of HIDCL, 2079
- 7.9 Critical review of HIDCL, scope of reform and development of HIDCL

द्वितीय पत्र - Service Specific

खण्ड (क) जलस्रोत र योजना तर्जुमा (५० अङ्क)

(३ प्रश्न × १० अङ्क र १ प्रश्न × २० अङ्क)

1. **Water Resources Development and Management (10 Marks)**
 - 1.1 Integrated Water Resources Management: definition, concept and principles
 - 1.2 Issues and their resolution with respect to water resources development and management in Nepal: (i) in the sector as a whole; (ii) and pertaining to the current federal state structure
 - 1.3 Availability and use of water resources in Nepal, in the neighborhood and in the world
 - 1.4 Water stress, climate change and its impacts viz. GLOF and extreme flow events on water sector and options for resilience
2. **Transboundary Water Resources Management and Electricity Trade (10 Marks)**
 - 2.1 Doctrines of transboundary water resources management
 - 2.2 Transboundary water related rules: Helsinki Convention, 1992 and UN Watercourses Convention, 1997
 - 2.3 Provisions and issues of: Koshi and Gandak Agreements; and Integrated Mahakali River Treaty - between Nepal and India
 - 2.4 Opportunities and challenges in development and management of boundary and transboundary rivers and their basins, and ways forward to meet them
 - 2.5 Nepal India Power Trade Agreement of 2014 and other power related bilateral agreements and arrangements
 - 2.6 Concept of regional electricity trade and related regional and multi-national framework and other agreements
3. **Water Resources, Hydropower Development and Energy Planning (10 Marks)**
 - 3.1 River basins of Nepal, their potentials and current status
 - 3.2 River basin planning: concept, need, history, current status and enforceability
 - 3.3 Hydropower development master plans: need, history, current status and enforceability
 - 3.4 Water allocation among different uses and projects, legal and institutional provisions for such allocation
 - 3.5 Methods of working out benefit sharing and cost apportionment among different uses/users in multipurpose water resources projects, including those involving more than one country
 - 3.6 Energy mix and energy source diversification
4. **Planning and Investigation of Hydropower Projects (20 Marks)**
 - 4.1 Hydropower project development cycle, reconnaissance, prefeasibility and feasibility studies; and various surveys and investigations with varying details under them viz. power market survey, hydrological study, topographical and profile survey, geological/geotechnical and seismic studies, material survey, disaster risk analysis, etc.

- 4.2 Development of alternative plans as regards – (i) regulation works (storage dams and diversion works, spillways, coffer dams and diversion tunnels/canals); (ii) intake and conveyance systems including trashracks and desanders, headrace tunnels/canals, upstream and downstream surge tanks, forebays, pressure shafts, penstocks, valves, tailrace tunnels/canals, draft tubes or turbine pits, cross-drainage structures, etc.; (iii) power station including electromechanical equipment, such as turbines, governing systems, cooling and ventilation systems, cranes, etc. and generators, switchyard, etc.; and (iv) transmission and other power evacuation facilities
- 4.3 Project layouts in both single purpose hydropower and multipurpose water resources projects based on different combinations of the alternatives as provided in Section 4.2 above
- 4.4 Criteria of selection from and design of the components of the alternatives as provided in Section 4.2 above
- 4.5 Methods and bases of cost and benefit estimates

खण्ड (ख) – वित्तीय पक्ष, आयोजना कार्यान्वयन, संचालन, र वातावरण (५० अङ्क)
(३ प्रश्न × १० अङ्क र १ प्रश्न × २० अङ्क)

5. Hydropower Project Related Financial Features (10 Marks)

- 5.1 Detailed understanding of various hydropower project finance related arrangements and terms: capitalized interest; equity and debt; escrow account; functioning of spot market of electricity; interest during construction; marginal cost of capital; mezzanine financing; non-recourse, limited recourse and recourse financing; power bond; project cashflow; refinancing of project; syndicated loan;
- 5.2 Financial and economic analyses: benefit cost ratio, net present value, internal rate of return, breakeven analysis, return on investment & return on equity, payback period, minimum attractive rate of return and their application, sensitivity analysis
- 5.3 Key considerations of debt and equity financing and cost of capital with mixed financing
- 5.4 Electricity tariff: tariff design, rate cases and process of tariff determination
- 5.5 Energy wheeling charge, energy pool market, availability-based tariff

6. Financing for Hydropower Project Implementation (20 Marks)

- 6.1 General requirements for initiating project implementation: technical and financial viabilities, environmental clearance, power purchase agreement and financial close
- 6.2 Need and principal contents of concession/project development agreements with special focus on government's financial obligations
- 6.3 Financing/investment in hydropower project development: (i) public sector funding (ii) private sector funding (iii) public-private partnership funding and (iv) community and crowd funding; differences in, and features of, these kinds of investments
- 6.4 Transaction advisory services: due diligence, valuation services, lender and sovereign advices, regulatory framework analysis, risk mitigation, etc.

- 6.5 Equity structure, sweat equity, local shares, public shares, loan agreement and its principal features, front loading, debt servicing
 - 6.6 Technical/environmental and financial risks: geological surprises, natural disasters, political and social risks, foreign exchange risk, inflation, defaulting investor/offtaker, etc.; and risk coverage mechanisms such as insurance, hedging, sovereign and multilateral agency guarantees, etc.
 - 6.7 Mechanisms of private sector investment in hydropower component of multipurpose water resources projects, viability gap funding in hydropower and other energy projects
 - 6.8 Challenges in financing hydropower and other power related infrastructure in Nepal
7. **Hydropower Project Implementation and Operation (10 Marks)**
- 7.1 Additional surveys and investigations required for hydropower project implementation
 - 7.2 Detailed design; preparation of - detailed drawings, working drawings, cost estimates & bill of quantities, specifications and tender documents
 - 7.3 Selection of project contractors, suppliers, consultants
 - 7.4 Preparation of construction schedules and resource procurement & management
 - 7.5 Panel of experts and troubleshooting
 - 7.6 Quality control
 - 7.7 Project testing and commissioning
 - 7.8 O&M planning, selection of O&M contractors, project O&M and project handover to Government
8. **Environmental and Social Aspects of Hydropower (10 Marks)**
- 8.1 Environmental and social assessment and clearance processes of hydropower projects in Nepal
 - 8.2 Introduction to strategic environmental assessment and cumulative environmental impact assessment
 - 8.3 Resettlement and rehabilitation issues in hydropower projects; Land Acquisition, Resettlement and Rehabilitation Policy, 2014
 - 8.4 Stakeholder management, public concerns and redressal mechanism
 - 8.5 Equator principles and their upsides and downsides in Nepal's hydropower development
 - 8.6 Safeguard guidelines of international donor agencies World Bank, IMF, ADB
 - 8.7 Manual for public involvement in Environmental Impact Assessment (EIA) process of hydropower projects, 2001
 - 8.8 National Environmental Impact Assessment Guidelines, 1993