

## नेपाल विद्युत प्राधिकरण

प्राविधिक सेवा, मेकानिकल समुह, तह-१० प्रबन्धक पदको  
खुला तथा आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्र: सेवा सम्बन्धी विस्तृत ज्ञान (१०० पुर्णाङ्क)

| पत्र    | विषय                             | पुर्णाङ्क | उत्तीर्णाङ्क | खण्ड | परीक्षा प्रणाली                        | प्रश्न संख्या | प्रति प्रश्न अङ्कभार | समय     |
|---------|----------------------------------|-----------|--------------|------|--|---------------|----------------------|---------|
| द्वितीय | सेवा सम्बन्धी<br>(विस्तृत ज्ञान) | १००       | ४०           | क    | लामो उत्तर/<br>विश्लेषणात्मक समिक्षा   | २             | १५                   | ३ घण्टा |
|         |                                  |           |              |      | विश्लेषणात्मक<br>समिक्षा/समस्या समाधान | १             | २०                   |         |
|         |                                  |           |              | ख    | लामो उत्तर/<br>विश्लेषणात्मक समिक्षा   | २             | १५                   |         |
|         |                                  |           |              |      | विश्लेषणात्मक<br>समिक्षा/समस्या समाधान | १             | २०                   |         |

खण्ड (क)

(२x१५=३०, १x२०=२०) - अङ्क ५०

### 1. Hydropower engineering:

- 1.1 History and development of Hydro power in Nepal and world
- 1.2 Types of power plant: run-of-river, Peaking RoR, storage, pumped storage
- 1.3 Classification of hydropower plant: with different criteria (Head, Layout, Size etc.)
- 1.4 Safety measures and precautions applied in power plant
- 1.5 Environmental impact of hydropower plant

### 2. Hydro Power Station:

- 2.1. Turbine: types, selection, capacity, speed, equipment layout
- 2.2. Main components of turbine and their maintenance: runner, guide and thrust bearings, guide vanes/nozzles, draft tube, Head cover, wearing & facing Plates, shaft, labyrinth Ring.
- 2.3. Governor: type, design criteria, installation and maintenance
- 2.4. Turbine Inlet valve: types, design criteria, installation and maintenance
- 2.5. Types, design criteria, installation and maintenance of Plant ancillary system (high-pressure oil system, lubricating oil system, cooling water system, drainage and dewatering system, compressed air system, unit braking system, automatic grease lubrication system, oil handling system, air conditioning and ventilation system, fire detection and firefighting system)
- 2.6. Auxiliary equipment: overhead traveling crane, diesel engine generating set
- 2.7. Instrumentation
- 2.8. Penstock: types, design criteria, installation and maintenance
- 2.9. Gates and hosting equipment: types, design criteria, installation, Operation and maintenance
- 2.10. Valve: types, design criteria, installation and maintenance

**3. Thermal Power Station:**

- 3.1. Prime mover: types, selection, installation, operation and maintenance
- 3.2. Fuels: types, properties, alternative fuels
- 3.3. Repair and maintenance of equipment of thermal power stations.

**4. Towers & Poles:**

- 4.1. Transmission & Distribution line tower: types, design criteria erection and maintenance

**5. Safety Engineering and Equipment Replacement Policy:**

- 5.1. Principles of industrial hygiene
- 5.2. Occupational safety and hazard control
- 5.3. System safety & Reliability
- 5.4. Industrial health and safety, Safety Guidelines & regulation as per labour Act in Nepal
- 5.5. Life cycle costing
- 5.6. Standardization of equipment /Machinery
- 5.7. Equipment /Machinery selection/ alternatives

खण्ड (ख)

(२x१५=३०, १x२०=२०)- अङ्क ५०

**6. Maintenance Management:**

- 6.1. Maintenance Management and strategy
- 6.2. Evolution of maintenance
- 6.3. Failure analysis
- 6.4. Various Maintenance Practices in Powerplant
- 6.5. Abrasion/ erosion resistant Coating process

**7. Contract management:**

- 7.1. Familiarization with Procurement guidelines and standards of GoN (PPMO) World Bank & Asian Development Bank (WB & ADB)
- 7.2. Preparation of contract documents, specifications, condition of contract and other contractual procedures.
- 7.3. International Standard Bidding Document, National Standard Bidding Document.
- 7.4. Arbitration & Others dispute resolution practices.

**8. Engineering Economics:**

- 8.1. Disbursement scheduling, Cash flow analysis, Time value of money
- 8.2. Project evaluation indicators, IRR, Payback Period and others criterion, choosing the best alternative
- 8.3. Incremental Analysis, Sensitivity & Breakeven Analysis
- 8.4. Risk analysis, Inflation & price change
- 8.5. Rationing limited financial resources between projects
- 8.6. Taxation system in Nepal
- 8.7. Energy tariff schemes and regulatory issues.

**9. International Treaty and Conventions:**

- 9.1. Koshi Agreement, 1954/1966
- 9.2. Gandak Agreement, 1959
- 9.3. Electricity Exchange 1961
- 9.4. Treaty between the Government of Nepal and Government of India concerning the integrated development of Mahakali River including Sarada Barrage, Tanakpur Barrage and Pancheswar Project.

**10. Service-Related Manuals:**

- 10.1. Manual for public Involvement in Environmental Impact Assessment (EIA) process of Hydropower Projects
- 10.2. Manual for preparing Terms of Reference (TOR) for environmental Impact Assessment, (EIA) of Hydropower Projects
- 10.3. Manual for preparing Scoping Document for Environmental Impact Assessment (EIA) of Hydro power Projects,
- 10.4. Manual for preparing Environmental Management Plan (EPM) for Hydropower Projects
- 10.5. National Environmental Impact Assessment Guidelines, 1993,
- 10.6. Safety Guidelines and Standards for Generation, Transmission and Distribution of Hydro Electricity.
- 10.7. Manual or Guideline for operation & Maintenance of Hydropower Plant.

