नेपाल विद्युत प्राधिकरण

प्राविधिक सेवा, सिभिल समूह, सिभिल उपसमूह, तह-५, **ड्राफ्टमेन** पदको

खुल्ला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

१. लिखित परीक्षाको विषय, पुर्णाङ्क, परीक्षा प्रणाली, प्रश्नसंख्या, अंकभार र समय निम्नानुसार हुनेछ ।

पत्र	विषय	पुर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या	प्रति प्रश्न अंकभार	समय
प्रथम	आधारभुत सामान्य ज्ञान र सेवा सम्बन्धी	१००	४०	वस्तुगत वहु बैकल्पिक प्रश्न	खण्ड (क) आधारभुत सामान्य ज्ञान	२०	२	४५ मिनेट
					खण्ड (ख) सेवा सम्बन्धी	३०	२	
द्वित्तिय	सेवा सम्वन्धी	१००	४०	विषयगत प्रश्न	छोटो उत्तर आउने प्रश्न	१०	५	२ घण्टा ३० मिनेट
					लामो उत्तर आउने प्रश्न	५	१०	

२. प्रथमपत्रको खण्ड (क) सबै समूहको लागि एउटै हूनेछ । प्रथमपत्रको खण्ड (क) समाप्त भएपछि एकै सिटिङ्ग खण्ड (ख) को परीक्षा हुनेछ । प्रथमपत्रको खण्ड (ख) र द्वितीयपत्रको पाठ्यक्रम एउटै हुनेछ ।

३. बस्तुगत प्रश्नमा प्रत्येक प्रश्नका चार वटा सम्भाव्य उत्तर दिइने छ । जसमध्ये एउटा सही उत्तर लेख्नु पर्नेछ । गलत उत्तर बापत प्रति गलत उत्तर २० प्रतिशतका दरले अंक घटाइनेछ ।

४. प्रथमपत्र र द्वितीयपत्रको परीक्षा फरक फरक हुनेछ ।

५. परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ ।

६. सामान्यतः प्रत्येक इकाईबाट प्रश्नहरु सोधिनेछन् । प्रत्येक इकाईको अंकभार तोकिए बमोजिम हुनेछ । लामो उत्तर दिनुपर्ने प्रश्न एकै वा खण्ड खण्ड गरी (दुई वा सो भन्दाबढी) सोध्न सकिनेछ ।

प्रथमपत्रः

खण्ड (क) आधारभुत सामान्य ज्ञान (प्राविधिक सेवा, तह-५ का सबै समुहका लागि):

१. नेपालको भुगोलः धरातलीय स्वरुपको किसिम र विशेषता, नदीनाला, तालतलैया र खनिज पदार्थ, राजनैतिक विभाजन (संघ, प्रदेश तथा स्थानीय तह) ।

२. नेपाल विद्युत प्राधिकरण सम्बन्धि जानकारीः स्थापना, नेपाल विद्युत प्राधिकरणका व्यवसाय/निर्देशनालयहरु, प्राधिकरणको काम, कर्तव्य र अधिकार, संचालक समिति ।

३. दक्षिण एशियाली क्षेत्रीय सहयोग संगठन (SAARC) बारे सामान्य जानकारी ।

४. राष्ट्रिय महत्वका समसामयिक घटना तथा नविनतम गतिविधिहरु ।

५. सामान्य गणितिय अभ्यासः अनुपात, भिन्न, प्रतिशत, औषत, अंकगणितिय तर्क, नाफा-नोक्सान, श्रेणीक्रम ।

६. विद्युत चोरी नियन्त्रण ऐन, २०५८ अनुसार विद्युत चोरी मानिने अवस्था, विद्युत चोरी नियन्त्रण नियमावली, २०५९ अनूसार विद्युत आपुर्ति बन्द गर्न सक्ने, पुनः जडान गर्ने अवस्था र पुरस्कार व्यवस्था ।

७. विद्युत वितरण विनियमावली, २०६९ को विद्युत लाईन एवं मिटर जडान सम्बन्धी व्यवस्था र मिटर जाँच तथा मिटर रिडिङ्ग सम्बन्धी व्यवस्था ।

प्रथमपत्र खण्ड (ख) र द्वितीयपत्रको पाठ्यक्रम (सिभिल समूह)

1. DRAWING (2x2=4)

1.1 Importance, aims and objectives of drawing

1.2 Drafting techniques and methods in common practice

1.3 Scales: Choice, use and conversion

1.4 Measured Drawing

1.5 Methods of measurement of horizontal and vertical dimensions

1.6 Sectional measurements

1.7 Role of working drawing, Interrelationship with estimate and specification

1.8 Significance of detailing in terms of accuracy of estimation, bill of quantities and construction Supervision

1.9 Difference of tender drawing and working drawing

1.10 Preparation of large- scale construction details in plan and section. Importance of such details in terms of accuracy of estimation, Bill of Quantities and Construction supervision.

1.11 Tracing of topographical maps and drawings, of construction schedule and presentation of maps and drawings with required features, accuracy and standard.

2. SURVEYING (2x2=4, 1x5=5,1x10 =10)

2.1. General**:** Classifications, Principle of surveying, Selection of suitable method, Scales, plans and maps, Entry into survey field books and level books

2.2. Accuracy, errors and the methods of adjustments in surveying.

2.3. Levelling: Methods of levelling, Levelling instruments and accessories, Principles of levelling

2.4. Traverse surveying**:** Tachometry: stadia method, Trigonometrical levelling, Checks in closed traverse

2.5. Contouring**:** Characteristics of contour lines, Method of locating contours, Contour plotting

2.6. Setting Out**:** Small buildings, Simple curve

2.7. General concept of survey for power house and tunneling.

3. CONSTRUCTION MATERIAL (2x2=4, 1x5=5, 1x10 =10)

3.1 Stone: Formation and availability of stones in Nepal, Methods of laying and construction with various stones

3.2 Cement: Different cements: Ingredients, properties and manufacture, Storage and transport, Admixtures

3.3 Brick: types, laying, bonds

3.4 General knowledge of types of conductors, fittings, insulators, insulator protective fittings and line insulator materials.

3.5 Sand/Aggregate: Sand /Aggregate Properties, Bulking of Sand

4. MECHANICS OF MATERIALS AND STRUCTURES (2x2=4)

4.1 Mechanics of Materials: Internal effects of loading, Ultimate strength and working stress of materials

4.2 Mechanics of Beams: Relation between shear force and bending moment Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading.

4.3 Simple Strut Theory

5. HYDRAULICS (2x2=4, 1x5 =5)

5.1 General

5.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity

5.1.2 Pressure and Pascal's law

5.1.3 Hydro-Kinematics and Hydro-Dynamics: Energy of flowing liquid: elevation energy, Kinetic energy, potential energy, internal energy

5.2 Measurement of Discharge: Weirs and notches and Discharge formulas
5.3 Flows: Characteristics of pipe flow and open channel flow

6. GEOTECHNICAL (3x2=6,1x10=10)

6.1 General concept of geology, Geological investigation.

6.2 Rock Types & Composition, Rock Particles & Particle Systems, Classification of rocks (soil) and their significance.

6.3 Classification of soil, soil-water relation and their significance.

6.4 General concept of consolidation and compaction, and their distinguishing characteristics.

6.5 Factors affecting soil compaction.

6.6 Methods of soil compaction for preparing foundation. Foundation treatments.

6.7 Concept of optimum moisture content, its significance and methods to control moisture content.

6.8 Active and passive earth pressures, their definition and general understanding. Concept of surcharge load.

6.9 Bearing capacity, safe bearing capacity and ultimate bearing capacity of foundation.

6.10 Types of foundation and their application.

6.11 Soil exploration, its need and procedure.

6.12 General concept of diversion structure.

6.13 General concept about stability of structure, the destabilizing and stabilizing factors.

6.14 Methods of Geological investigation (Surface investigation, Sub surface Investigation, methods)

7 STRUCTURAL DESIGN (2x2=4, 1x5=5)

7.1 R.C. Sections in Bending: Under reinforced, over reinforced and balanced sections: Analysis of single and double reinforced rectangular sections

7.2 Shear and Bond for R.C. Sections: Shear resistance of a R.C. section, Types of Shear reinforcement and their design, Determination of anchorage length

7.3 Axially Loaded R.C. Columns: Short and long columns, Design of a rectangular column section

7.4 Design of R.C. Structures: Singly and doubly reinforced rectangular beams, Simple one-way and two-way slabs, axially loaded short and long columns

7.5 Understanding of steel structures and their simple design with criteria and the procedure.

7.6 General mechanical features of the transmission lines.

7.7 General precautions to be taken during the design and construction process.

7.8 Span length of transmission line.

7.9 Concept of line supports- poles and towers and their basic design.

7.10 Construction and manufacture of poles and towers.

7.11 Live- metal clearance and effect of other materials in proximity.

7.12 General concept about stability of structure and the destabilizing and stabilizing factors.

8 BUILDING CONSTRUCTION AND TECHNOLOGY (2x2=4, 1x5=5, 1x10=10)

8.1 Foundations: Subsoil exploration, Type and suitability of different foundations: Shallow, deep, Shoring and dewatering, Design of simple brick or stone masonry foundations.

8.2 Walls: Type of walls and their functions, choosing wall thickness, Height to length relation, Use of scaffolding .

8.3 Damp Proofing: Source of Dampness, Remedial measures to pr-went dampness.

8.4 Concrete Technology: Constituents of cement concrete, Grading of aggregates, Concrete mixes, Water cement ratio, Factors affecting strength of concrete, Form work, Curing .

8.5 Wood work: Frame and shutters of door and window, Timber construction of upper floors.

8.6 Flooring and Finishing: Floor finishes: brick, concrete, flagstone and Plastering

8.7 Drawing of Building section from Foundation to roof.

9 ESTIMATING AND COSTING (2x3=6, 1x5=5)

9.1 Various methods of measurements and estimating quantities of civil works. Different units in, which the various quantities are expressed.

9.2 Bases and considerations in preparing analysis of rates for civil works.

9.3 Development of unit rates and factors affecting the unit rates.

9.4 Preparing analysis of rates for civil works with related to hydropower projects.

9.5 Methods of cost estimating. Preparation of project cost estimate.

9.6 Objectives and importance of specification for different types of work. Techniques of preparing specifications for different types of works.

9.7 Preparation of Bill of Quantities. Its functions and measurement techniques & Accuracy in Measurement. Its significance.

9.8 Importance of Valuation.

10. CONSTRUCTION MANAGEMENT (2x2=4, 1x5 =5)

10.1 Organization: Need for organization, Responsibilities of a Civil Sub Engineer, Relation between Owner, Contractor and Engineer

10.2 Site Management: Preparation of site plan, organizing labor, Measures to improve labor efficiency, Accident prevention

10.3 Contract Procedure: Contracts, Departmental works and day-work, Types of contracts, Tender and tender notice, Earnest money and security deposit, Preparation before inviting tender, Agreement, Conditions of contract and Construction supervision

10.4 Accounts: Administrative approval and technical sanction, Familiarity with standard account keeping formats used in governmental organizations, Muster roll, Measurement Book, Running Bill, Final Bill, and Project Completion report

10.5 Planning and Control: Construction schedule, Equipment and materials schedule, Construction stages and operations, Bar chart, CPM and PERT.

10.6 Safety measures and programs in excavation, drilling, blasting, tower erection, cable stringing and underground works.

11. HYDRAULIC STRUCTURES (2x2=4, 1x5=5, 1x10=10)

11.1 Headwork structures (Dams, Spillways), types and components.

11.2 General concept of design parameters of headwork structure. Computation of waterpower potential.

11.3 Hydropower plants, type and components.

11.4 General concept of design parameters of hydropower plants.

11.5 Understanding of power station, substation, penstocks, turbine, surge tank, the draft tube, the tail race and energy dissipaters.

11.6 Causes of failures of dams (general knowledge).

11.7 General understanding of surface hydrology.

11.8 General functions of hydraulic structures. (Dams, spillways, intake, canal, tunnel.

11.9 Design and layout of form works (scaffolding).

11.10 Protective structures, types and functions.

11.11 River training works, types, functions and layouts.

12. TRANSMISSION LINES AND TOWERS (2x2=4,1x5=5)

12.1 Types of electrical towers and transmission lines.

12.2 Design parameters of transmission towers.

12.3 Design parameters of transmission lines.

12.4 General understanding of power station, substation.

13. DISTRIBUTION (2x2=4,1x5=5)

13.1 General knowledge of types and categories of distribution (transmission) cables with reference to distribution.

13.2 General knowledge about technical problems, such as, power loss, leakage and cases of thefts.

13.3 Knowledge of general internal wiring and connections.

13.4 General acquaintance with the social problems and issues in reference with distribution system.

13.5 Techniques of connection of single circuits with single phase, 3- phase power supply system.

13.6 Installation of a rigid PVC conduit (pipe or holder pipe) on masonry surface.

13.7 Mounting of fixtures such as wall plugs, boxes and blocks on wall surfaces.

13.8 Safety precautions.

14. INSTITUTIONAL KNOW-HOW (2x2=4)

14.1 General knowledge of Nepal Electricity Authority, its organizational structure and function of various business groups.

14.2 General knowledge of various power plants of Nepal, their types, salient features, and their geographical locations.

14.3 General knowledge on Nepalese power transmission system, voltage levels and line lengths, export-import links for power exchange with India.

द्रष्टव्यः पाठ्यक्रममा राखिएका संविधान, ऐन, नियम र विनियमहरु परीक्षा हुनुभन्दा ३ महिना अगाडी सम्म संशोधन वा खारेज भई त्यसको सट्टा हाल प्रचलनमा रहेकालाई सोही अनुरुप पाठयक्रममा समावेश भएको मानिने छ ।

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