



प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद्
पदपूर्ति समिति
सानोठिमी, भक्तपुर ।

प्राविधिक तथा प्रशिक्षण सेवा, इन्जिनियरिङ्ग प्राविधिक प्रशिक्षण समूह, सिभिल/स्यानिटेशन
इन्जिनियरिङ्ग उप-समूह अधिकृतस्तर तृतीय श्रेणी
निर्माण/स्यानिटरी/प्लम्बिङ्ग प्रशिक्षक पदको
खुला र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्र : सेवा सम्बन्धी

पूर्णाङ्क : १००

1. Construction Materials (5%)

- 1.1 Properties of Building Materials: Physical, Chemical ,constituents, Thermal etc.
- 1.2 Stones: Characteristics and Requirements of stones as a Building Materials.
- 1.3 Ceramic Materials: Ceramic Tiles, Mosaic tiles, Bricks type and Testing etc.
- 1.4 Cementing Materials: Types and properties of Lime and Cement , Manufacturing Process, Cement Mortar and Different Tests
- 1.5 Metals : Steels, Types and properties , Alloys
- 1.6 Timber and Wood : Timber trees in Nepal, Hard and Soft wood , Characteristics of good Timber, Seasoning, Preservation of timber , Plywood, Batten board etc
- 1.7 Miscellaneous Materials : Asphalt , Bitumen , Paint and Varnishes, Glass, Polymers
- 1.8 Soil Properties and Parameters.

2. Drawing Techniques (5%)

- 2.1 Drawing sheet composition and its essential components
- 2.2 Suitable scales , site plans ,Preliminary Drawings , Working drawings etc
- 2.3 Theory of Projection drawings: Perspective , Orthographic and Axonometric Projection, First and Third angle Projection
- 2.4 Drafting Tools and equipments
- 2.5 Drafting Symbols
- 2.6 Topographic, Electrical, plumbing and structural drawings
- 2.7 Technique of Free Hand Drawing.

3. Engineering survey (10%)

- 3.1 Introduction and Basic Principles, Linear Measurement, Chain Survey, Compass Survey, Plane table survey, Leveling and Contouring, Abney Level survey, Theodolite Traversing , Tachometry survey, Trigonometrically Leveling , Hydrographic Survey etc
- 3.2 Use of Total Station and Electronic Distance Measuring Instruments
Hydrographic surveying

4. Concrete Technology (5%)

- 4.1 Constituents and Properties of Concrete, water Cement ratio, Grade and strength of concrete , Concrete Mix Design, Testing of Concrete
- 4.2 Mixing Transportation , Pouring and Curing of concrete
- 4.3 Admixtures,
- 4.4 High strength concrete
- 4.5 Pre stressed concrete Technology

5. Building Construction, Housing and Urban planning (5%)

- 5.1 Load bearing and framed structures, Foundation types and its design
- 5.2 Types of walls , Types of roofs
- 5.3 Types of Doors and Windows, Types of Stair and design of Dog legged Stair
- 5.4 Damp Proofing Methods
- 5.5 Plastering and pointing
- 5.6 Shoring, Scaffolding, Under pinning, Timbering of Trenches, Formworks
- 5.7 Present Status and Practices of building construction in Nepal
- 5.8 Specific Consideration in design and consideration of buildings in Nepal
- 5.9 Community Buildings: Schools and hospital buildings and their design Considerations
- 5.10 Local and Modern Building Construction Materials in Nepal
- 5.11 Urban Planning need and challenges in Nepal

6. Fluid mechanics and hydraulic (5%)

- 6.1 Properties of Fluid, Hydrostatics fore on plane and curved surfaces, Buoyancy
- 6.2 Types of Flow, Continuity Equation, Bernoulli equation and its application, Momentum equation, Flow in Curved Path etc
- 6.3 Uniform and Non Uniform flow in channels
- 6.4 Specific energy and momentum principle and application
- 6.5 Analysis of pipe flow, Pipelines and Pipe Systems
- 6.6 Pipe networks and their analyses, water hammer phenomenon

7. Soil Mechanics and Highway engineering (10%)

- Phase Diagrams, Physical Properties of soils and classification tests, Classification of Soils,
- 7.1 Permeability of soil, Compaction and Consolidation of soil, Shearing Characteristics of Soil, Bearing capacity of soils, Earth pressure, Stability of slopes etc
Transportation system and its Classification
 - 7.2 Road transport and road construction in Nepal
 - 7.3 Classification of Roads in Nepal
 - 7.4 Feasibility study of road projects
 - 7.5 Road Alignment and engineering survey
 - 7.6 Highway Geometric Design
 - 7.7 Hill roads(Problems associated with hill road construction, Route location, Hairpin bends, special structures)
 - 7.8 Types of Road Pavements and their applicability, Construction procedure of Different types of roads
 - 7.9 Bioengineering practices in hill side
 - 7.10 Activities and techniques in road construction in rural roads
 - 7.11 Maintenance of Roads
 - 7.12 Basic Knowledge on design, construction and Maintenance of Suspended and Suspension Bridge in Nepal (Based on TBSSP Manual)
 - 7.13 Low cost road construction

8. Structure Analysis and Design (15%)

- 8.1 Stress and strains, Theory of tension and Flexure, Moment of Inertia, Centre of Gravity

Analysis of Beams and Frames: Bending Moment, Shear force deflection of beams and frames, determinate structure- Energy Methods , Three hinged system.
- 8.2 Indeterminate structures - Slope and deflection method and moment distribution method, Use of influence line Diagrams for simple beams, Unit load Method.

- 8.3 RCC structures: Difference between working Stress and limit State Philosophy, Analysis of RC Beams, Slabs in bending, shear, deflection, bond and end anchorage, Design of axially loaded Columns, isolated and combined footings, Pre Stressed Concrete.
- 8.4 Steel and Timber Structures: Standard and Built up Sections , Design of Riveted, Bolted and Welded connections , Design of simple elements(Ties, strut, axially loaded and eccentric Columns, column base), Design principles of on Timber beams and columns

9. Estimating costing and valuation (8%)

- 9.1 Types of estimate and their specific uses
- 9.2 Methods of Calculating Quantities
- 9.3 Estimate of: Building Works, Road earthwork, Canal earthwork, Retaining walls, sanitary works, and Water Supply works.
- 9.4 Estimating Norms and Rate analysis
- 9.5 Bill of Quantities, Specifications and its type and purpose
- 9.6 Running bill and Final Bills and its Payment procedures
- 9.7 Valuation : Its Purpose , principles and methods

10. Water supply and Sanitary engineering (10%)

- 10.1 Rural and Community Based water Supply system
- 10.2 Selection of Source, Water demand
- 10.3 Water quality and Treatment, water demand and Supply, Source Protection
- 10.4 Intakes, Break Pressure tank, Collection chamber etc
- 10.5 Reservoir and Distribution system
- 10.6 Intakes, Pipe line design, Design of Transmission and distribution System, Reservoir design
- 10.7 Pipe and Fittings: Pipe Materials, Pipe laying and Fittings
- 10.8 Operation and Maintenance of water Supply Systems
- 10.9 Sanitation, waste water and solid waste management : On site sanitation system. Types of sewerage system , design and Construction of sewers. Types , Characteristics, sources , quantity, generation, collection , transportation and disposal of solid wastes.)
- 10.10 Sanitary Landfill, incineration, Composting etc
- 10.11 Environmental Health Engineering: Epidemiology, Pathogens (Bacteria, virus, helminthes, protozoa)

11. Irrigation Engineering (5%)

- 11.1 Status of Irrigation Development in Nepal
- 11.2 Methods of Irrigation, Water Requirements for crops, Duty and delta, Canal Losses etc
- 11.3 Design of Irrigation Canals.
- 11.4 Operation and Maintenance of Irrigation Systems
- 11.5 Water logging: Preventive and remedial Measures
- 11.6 River training and Slope protection Works
- 11.7 Specific Consideration in design , operation and management of hill irrigation systems

12. Hydrology and hydropower engineering (7%)

- 12.1 Hydrological cycle and water balance
- 12.2 Precipitation and losses
- 12.3 Surface runoff and hydrological analysis

- 12.4 Flood frequency analysis
- 12.5 Hydropower development in Nepal
- 12.6 Hydrological study, planning and design of small Hydropower Projects
- 12.7 Types of dams and their properties
- 12.8 Head Works , Dam , Spillways, Surge tanks , Stilling basin etc
- 12.9 Water conveyance structures
- 12.10 Power house and hydro electric equipments

13. Construction Management (5%)

- 13.1 Construction scheduling and Planning: Network techniques,(CPM, PERT) and bar Charts.
- 13.2 Contractual Procedures and Managements: Types of Contract, Tender and Tender notice, Preparation of Tender document, Contractors Pre Qualification, Evaluation of Tenders and Selection of Contractors, Contract acceptance, Condition of contract, Quotation and direct Order, Dispute Resolution, Muster rool etc.
- 13.3 Material Management: Procurement procedures and materials handling
- 13.4 Cost control and Quality control
- 13.5 Project Maintenance
- 13.6 Occupational health and safety
- 13.7 Project Monitoring and Evaluation
- 13.8 Variation , Alteration and Omissions

14 Engineering Economics (3%)

- 14.1 Benefit Cost Analysis, Cost classification, sensitivity analysis, internal rate of return, time value and money, economic equilibrium, demand supply and production, net present value, financial and economic evaluation.

15. केही ऐन नियमहरु (2%)

- नेपाल इञ्जिनियरिङ्ग ऐन तथा नियमहरु
- भवन ऐन, २०५५
- संयुक्त आवास ऐन, २०५५
- Nepal Road Standard, 2027
- Nepal Fedder Road Standard, 1997
- Public Works Directive, 2002

16. Instructional Skills and Classroom Management

- Learning Domains and learning styles
- Bloom's Taxonomy
- Be a professional Technical and Vocational Education and Training (TVET) Instructor
- Occupational Safety and Health

Program Evaluation

- Conduct a CIPP Evaluation
- Conduct Goal-Free Evaluations
- Kirkpatrick's Levels of Training Evaluation
- Tyler's Goal-Based Evaluation Approach.

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