बेनीघाट रोराङ ग्रामीण खानेपानी व्यवस्थापन बोर्ड
सव–ईन्जिनियर (पाँचौ) पदको पाठ्यक्रम
वस्तुगत तथा विषयगत पाठ्यक्रम

पूर्णाङ्क –१०० पद :- सव–ईन्जिनियर
उत्तीर्णाङ्क –४० तह :- पाचौ

1. Surveying

1.1 General

1.1.1 Principle and types of surveying
1.1.2 Units, scales and maps 1.1.3 Field books and Level books

1.2 Levelling

1.2.1 Principles and methods of levelling
1.2.2 Levelling instruments and accessories

1.3 Theodolite and Traverse surveying

1.4.1 Basic difference between different theodolites
1.4.2 Temporary adjustments of theodolites
1.4.3 Fundamental lines and desired relations
1.4.4 Tacheometry: stadia method
1.4.5 Trigonometrical levelling
1.4.6 Checks in closed traverse

1.4 Contouring

1.5.1 Characteristics of contour lines
1.5.2 Method of locating contours
1.5.3 Contour plotting
1.6 Setting Out: Small buildings and Simple curves

2. Construction Materials

2.1 Stone

2.1.1 Formation and availability of stones in Nepal
2.1.2 Methods of laying and construction with various stones

2.2 Cement

2.2.1 Different cements: Ingredients, properties and manufacture
2.2.2 Storage and transport
2.2.3 Admixtures

2.3 Clay and Clay Products

2.3.1 Brick: type, manufacture, laying, bonds

2.4 Paints and Varnishes: Type and selection; preparation techniques and use

2.5 Bitumen: Type, selection and use

3. Mechanics of Materials and Structures

3.1 Mechanics of Materials

3.1.1 Internal effects of loading
3.1.2 Ultimate strength and working stress of materials

3.2 Mechanics of Beams

3.2.1 Relation between shear force and bending moment

3.2.2 Shear and bending moment diagrams for statically determinate beams under various types of loading

3.3 Simple Strut Theory

4. Hydraulics

4.1 General

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

4.1.2 Pressure and Pascal's law

4.2 Hydro-Kinematics and Hydro-Dynamics

4.2.1 Energy of flowing liquid: elevation energy, Kinetic energy, potential energy, internal energy

4.3 Measurement of Discharge

4.3.1 Weirs and notches

4.3.2 Discharge formulas

4.4 Flows: Characteristics of pipe flow and open channel flow

5. Soil Mechanics

5.1 General

5.1.1 Soil types and classification

5.1.2 Three phase system of soil

5.1.3 Unit Weight of soil mass: bulk density, saturated density, submerged density and dry density

5.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index

5.2 Soil Water Relation

5.2.1 Terzaghi's principle of effective stress

5.2.2 Darcy's law

5.2.3 Factors affecting permeability

5.3 Compaction of soil

5.3.1 Factors affecting soil compaction

5.3.2 Optimum moisture content

5.3.3 Relation between dry density and moisture content

5.4 Foundation Engineering

5.4.1 Terzaghi's general bearing capacity formulas and their application

6. Structures

6.1 R.C. Sections in Bending

6.1.1 Under reinforced, over reinforced and balanced sections

6.1.2 Analysis of single and double reinforced rectangular sections

6.2 Shear and Bond for R.C. Sections

6.2.1 Shear resistance of a R.C. section

6.2.2 Types of Shear reinforcement and their design

6.2.3 Determination of anchorage length

6.3 Design and Working System of R.C. Structures

6.4.1 Singly and doubly reinforced rectangular beams

6.4.2 Simple one-way and two-way slabs

6.4.3 Axially loaded short and long columns

7. Building Construction Technology

7.1 Foundations

7.1.1 Subsoil exploration

7.1.2 Type and suitability of different foundations: Shallow, deep

7.1.3 Shoring and dewatering

7.1.4 Design of simple brick or stone masonry foundations

7.2 Walls

7.2.1 Type and thickness of walls

7.2.2 Use of scaffolding

7.3 Damp Proofing

7.3.1 Source of Dampness

7.3.2 Remedial measures for damp proofing

7.4 Concrete Technology

7.4.1 Constituents of cement concrete

7.4.2 Grading of aggregates

7.4.3 Concrete mixes

7.4.4 Water cement ratio

7.4.5 Factors affecting strength of concrete

7.4.6 Form work

7.4.7 Curing

7.5 Wood work

7.5.1 Frame and shutters of door and window

7.5.2 Timber construction of upper floors

7.5.3 Design and construction of stairs

7.6 Flooring and Finishing

7.6.1 Floor finishes: brick, concrete, flagstone

7.6.2 Plastering

8. Water Supply and Sanitation Engineering

8.1 General

8.1.1 Objectives of water supply system

8.1.2 Source of water and its selection: gravity and artisan springs, shallow and deep wells; infiltration galleries

8.2 Gravity Water Supply System

8.2.1 Design period

8.2.2 Determination of daily water demand

8.2.3 Determination of storage tank capacity

8.2.4 Selection of pipe

8.2.5 Pipe line design and hydraulic grade line

8.3 Design of Sewer

8.3.1 Quantity of sanitary sewage

8.3.2 Maximum, Minimum and self cleaning velocity

8.4 Excreta Disposal and Unsewered Area

8.4.1 Pit latrine

8.4.2 Design of septic tank

9 . Estimating and Costing

9.1 General

11.1.1 Main items of work

11.1.2 Units of measurement and payment of various items of work and material

11.1.3 Standard estimate formats of government offices

9.2 Rate Analysis

11.2.1 Basic general knowledge on the use of rate analysis norms prepared by Ministry of Works and Transport and the district rates prescribed by district development committee

9.3 Specifications

11.3.1 Interpretation of specifications

9.4 Valuation

11.4.1 Methods of valuation

11.4.2 Basic general knowledge of standard formats used by commercial banks and NIDC for valuation

10. Construction Management

10.1 Organization

10.1.1 Need for organization

10.1.2 Responsibilities of a civil Sub- engineer

10.1.3 Relation between Owner, Contractor and Engineer

10.2 Site Management

10.2.1 Preparation of site plan

10.2.2 Organizing labor

10.2.3 Measures to improve labor efficiency

10.2.4 Accident prevention

10.3 Procurement and Contract Procedure

10.3.1 Contracts and its types

10.3.2 Departmental works and day-work

10.3.3 Preparation of tender document

10.3.4 Tender procedure

10.3.5 Contract agreement

10.3.6 Conditions of contract

10.3.7 Construction supervision

10.4 Accounts

10.4.1 Administrative approval and technical sanction

10.4.2 Familiarity with standard account keeping formats used in governmental organizations

10.4.3 Muster roll

10.4.4 Completion report

10.5 Planning and Control

10.5.1 Construction schedule

10.5.2 Equipment and materials schedule

10.5.3 Construction stages and operations

10.5.4 Bar chart

11. General information about legislations

८.१ नेपालको संविधान (भाग १, २, ३, १७ र १८ तथा अनुसूचीहरू) (The Constitution of Nepal (From Parts 1, 2, 3, 17 & 18, and Schedules)

८.२ स्थानीय सरकार सञ्चालन ऐन, २०७४ मा पूर्वाधार विकास सम्बन्धी व्यवस्था (Local Government Operation Act, 2074(related to local infrastructures development)

८.३ ग्रामीण खानेपानी आयोजनाको दिगो व्यवस्थापन

८.४ वैज्ञानिक खानेपानी महशुल निर्धारण तथा संकलन

८.५ खानेपानी तथा सरसफाई निति, २०७१

प्रश्नपत्र योजना

१. वस्तुगत प्रश्न : ५० प्रश्न × १ अंक = ५० अंक

२. विषयगत प्रश्न

२.१ छोटो उत्तर आउने प्रश्न : ८ प्रश्न × ५ अंक = ४० अंक

२.२ लामो उत्तर आउने प्रश्न : १ प्रश्न × १ अंक = १० अंक

परिक्षा समय : २ घण्टा ३० मिनेट