नेपाली सेना

श्री भर्ना छनौट निर्देशनालय, कार्यरथी विभाग

जंगी अड्डा

प्रा.उ.से. सिभिल ईन्जिनियर (खुला) पदको लिखित परीक्षाको पाठ्यक्रम

२०७७

प्रा.उ.से. सिभिल ईन्जिनियर (खुला) पदको पेशा सम्बन्धी विषयको लिखित परिक्षा र प्रयोगात्मक परीक्षाको पाठ्यक्रमयोजना

समय:-४ घण्टा

पूर्णाङ्क:-१५०
उत्तीर्णाङ्क:- ६०

यो पाठयक्रम नेपाली सेनाको सैनिक प्राविधिक सेवा, सैनिक ईन्जिनियरिङ्ग समुह, सिभिल तथा आर्किटेक्चर उप-समुह अन्तर्गत प्रा.उ.से. सिभिल ईन्जिनियर (खुला) पदको उम्मेदवार छनौट परिक्षाको लागि निर्धारण गरिएको हो । लिखित परीक्षामा सरिक हुने उम्मेदवारहरुको पेशा सम्बन्धी विषय र पेशागत विषयको प्रयोगात्मक परिक्षाको लागी निम्न विषयहरुलाई आधार मानि प्रश्नहरु सोधिनेछ।

(क) लिखित परीक्षाको माध्यम नेपाली/अंग्रेजी वा दुवै भाषा हुनेछ ।
(ख) लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र अर्को चरणको परीक्षामा सम्मिलित गराईनेछ ।
(ग) प्रश्नपत्र निर्माण गर्दा पाठ्क्रममा समावेश भएका सबै विषयहरुलाई यथासंभव समिटनेछ ।
(घ) बस्तुगत र विषयगत संयुक्त रुपमा पूर्णाङ्क र उत्तीर्णाङ्क कायम गरिनेछ ।
(ङ) बस्तुगत र विषयगत परीक्षाको पाठ्यक्रम एउटै हुनेछ ।
(च) बस्तुगत र विषयगत विषयको लिखित परीक्षा एकैपटक वा छुट्टाछुट्टै गरी लिन सकिनेछ ।
(छ) यो पाठ्यक्रम मिति २०७७/०६/१४ गतेबाट लागु हुनेछ ।

लिखित परिक्षा योजना र पाठ्यक्रम

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परिक्षा प्रणाली		प्रश्नकोसंख्या x अंक	समय
पेशा सम्वन्धि	७५	६०	वस्तुगत (Objective)	बहु बैकल्पिक प्रश्न (Objective)	७५ प्रश्न X१अङ्क= ७५	१ घण्टा
	७५		विषयगत (Subjective)	छोटोउत्तर	९ प्रश्नX५ अङ्क = ४५	३ घण्टा
				लामोउत्तर	३ प्रश्नX१० अङ्क = ३०	

लिखित परीक्षाको पाठ्यक्रम

PART-A

OBJECTIVE TYPE

1. Structural Analysis and Design

1.1. Stress and strain; theory of torsion and flexure; moment of inertia

1.2. Analysis of beams and frames: bending moment, shear force and deflection of beams and frames: determinate structure- energy methods; three hinged systems, indeterminate structures-slope deflection method and moment distribution method; use of influence line diagrams for simple beams, unit load method

1.3. Reinforced concrete structure: Difference between working stress and limit state philosophy, analysis of RC beams and slabs in bending, shear, deflection, bond and end anchorage, Design of axially loaded columns; isolated and combined footings, introduction to pre-stressed concrete

1.4. Steel and timber structures: Standard and built up sections: Design of riveted, bolted and welded connections, design of simple elements such as ties, struts, axially loaded and eccentric columns bases, Design principles on timber beams and columns

2. Construction Materials

2.1 Properties of building materials; physical, chemical, constituents, thermal etc.

2.2 Stones: characteristics and requirements of stones as a binding materials

2.3 Ceramic materials: ceramic tiles, mosaic tile, brick type and testing

2.4 Cementing materials: types and properties of lime and cement; cement mortar tests

2.5 Metals: Steel; types and properties; Alloys

2.6 Timber and wood: timber trees in Nepal, types and properties of wood

2.7 Miscellaneous materials: Asphaltic materials (Asphalt, Bitumen and Tar); paints and varnishes; polymers

3. Concrete Technology

3.1. Constituents and properties of concrete (physical and chemical)

3.2. Water cement ratio

3.3. Grade and strength of concrete, concrete mix design, testing of concrete

3.4. Mixing, transportation, pouring and curing of concrete

3.5. Admixtures

4. Construction Management

4.1. Construction scheduling and planning: networks techniques (CPM, PERT) and bar charts

4.2. Contract procedure and management: types of contract, tender and tender notice, preparation of bidding document, contractors pre-qualification, evaluation of tenders and selection of contractor, contract acceptance, condition of contract; quotation and direct order, classification of contractors; dispute resolution; muster roll

4.3. Material management: procurement procedures and materials handling

4.4. Cost control and quality control

4.5. Project maintenance

4.6. Occupational health and safety

4.7. Project monitoring and evaluation

4.8. Quality assurance plan

4.9. Variation, alteration and omissions

5. Engineering survey

5.1. Introduction and basic principles

5.2. Linear measurements; chain, tape, ranging rod, and arrows, representation of measurements and common scales; source of error; effect of slope and slope correction for chain and tape measurements; abney level and clinometers

5.3. Compass and plane table surveying: bearing; types of compass; problem and source of error of compass survey; principles and method of plane tabling

5.4. Levelling and contouring: Principle of levelling; temporary and permanent adjustment of level; bench marks; booking method and their reduction; longitudinal and cross sectioning; reciprocal leveling; trigonometric leveling; contour interval and characteristics of contours; method of contouring

5.5. Theodolite traversing: need of traverse and its significance; computation of coordinates; adjustment of closed traverse; closing errors

5.6. Uses of total station and electronic distance measuringinstruments

6. Engineering Economics

6.1. Benefit cost analysis, cost classification, sensitivity analysis, internal rate of return, time value of money, economic equilibrium, demand, supply and production, net present value, financial and economic evaluation

7. Professional practices

7.1. Ethics, integrity and professionalism: code of conduct and guidelines for professional engineering practices

7.2. Nepal Engineering Council Act, 2055 and regulation, 2056

7.3. Relation with clients, contractor and fellow professionals

7.4. Public procurements practices for works, good and services and its importance

7.5. Building Bylaws

PART-B

SUBJECTIVE TYPE

1. **Geotechnical Engineering**
   - 1.1. Field identification of soils and soil classification: descriptive, textural, ISI,MIT and USCS
   - 1.2. Factors affecting permeability of soil, determination of coefficient ofpermeability: laboratory and field methods
   - 1.3. Factors affecting effective stress, capillary rise, quick sand condition
   - 1.4. Concept of shear strength, principal planes and principal stresses, Mohr-Coulomb theory of shear strength, calculation of normal stress and shearStress at different plane, relation of principle stress at failure condition,types of shear tests: direct shear test, unconfined compression test, triaxialtest, vane shear test
   - 1.5. Concept of consolidation, types of consolidation, test of consolidation, NC,OC, OCR, preconsolidation pressure
   - 1.6. Rankine's earth pressure theory, Coloumb'searthpressure theory, trialwedge theory, types of earth pressure, types of retaining wall, stabilityanalysis of earth retaining structures, techniques to increase stability ofretaining wall
   - 1.7. Types of bearing capacity and factors influencing bearing capacity, effectsof various factors on bearing capacity, modes of foundation failure,Terzaghi's general bearing capacity theory, ultimate bearing capacity ofcohesionless and cohesive soils, settlement: types, nature and effects
   - 1.8. Purpose of site investigation, planning of investigation, stages ofinvestigation, methods of boring, types of soil samplesIn-situ test: standard penetration test, dynamic cone penetration test,correction of N value, calculation of bearing capacity using N value forisolated footing, mat, pile and well, plate load test, pile load test

2. **Highway Engineering**
   - 2.1. General
     - 2.1.1 Introduction to transportation systems
     - 2.1.2 Classification of road in Nepal
     - 2.1.3 Basic requirements of road alignment
   - 2.2. Geometric Design
     - 2.2.1. Basic design control and criteria for design
     - 2.2.2. Elements of cross section, typical cross-section for all roads in filling and cutting
     - 2.2.3. Camber
     - 2.2.4. Determination of radius of horizontal curves
     - 2.2.5. Super elevation
     - 2.2.6. Sight distances
     - 2.2.7. Gradient
   - 2.3. Drainage System
     - 2.3.1. Importance of drainage system and requirements of a good drainage system
   - 2.4. Road Pavement
     - 2.4.1. Pavement structure and its components: subgrade, sub-base, base and surface courses
   - 2.5. Road Machineries
     - 2.5.1 Earth moving and compacting machines

3. Water Supply and Sanitation Engineering

3.1. General

3.1.1. Objectives of water supply system

3.1.2. Sourceof water and its selection: gravity and artisan springs, shallow and deep wells; infiltration galleries.

3.2. GravityWater Supply System

3.2.1. Design period

3.2.2. Determination of daily water demand

3.2.3. Determination of storage tank capacity

3.2.4. Selection of pipe

3.3. Design of Sewer

3.3.1. Quantity of sanitary sewage

3.3.2. Maximum, Minimum and self-cleaning velocity

4. Irrigation Engineering

4.1. General

4.1.1. Advantages and Disadvantages of irrigation

4.2. Water Requirement

4.2.1. Crop season and principal crops

4.2.2. Base period

4.3. Flow irrigation Canals

4.3.1. Canal losses and their minimization

4.3.2. Maximum and minimum velocities

4.3.3. Design of irrigation canal section based on manning's formula

4.3.4. Need and location of spillways

4.3.5. Head works for small canals

5. Estimating and Costing

5.1. General

5.1.1. Main items of work

5.1.2. Units of measurement and payment of various items of work and material

5.1.3. Standard estimate formats of government offices

5.2. Rate Analysis

5.2.1. 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

5.3. Specifications

5.3.1. Interpretation of specifications

5.4. Valuation

5.4.1. Methods of valuation

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

PART-A
FOR OBJECTIVE QUESTION

Units	Objective		Total Marks
	No of Questions	Marks	
1. StructuralAnalysis and Design			
1.1	5	5	**15**
1.2	3	3	
1.3	4	4	
1.4	3	3	
2. Construction Materials			
2.1	2	2	**14**
2.2	3	3	
2.3	2	2	
2.4	2	2	
2.5	2	2	
2.6	2	2	
2.7	1	1	
3. Concrete Technology			
3.1	2	2	**10**
3.2	2	2	
3.3	2	2	
3.4	2	2	
3.5	2	2	
4. Construction Management			
4.1	1	1	**12**
4.2	2	2	
4.3	2	2	
4.4	1	1	
4.5	1	1	
4.6	1	1	
4.7	2	2	
4.8	1	1	
4.9	1	1	
5. Engineering survey			
5.1	2	2	**12**
5.2	2	2	
5.3	2	2	
5.4	2	2	
5.5	2	2	
5.6	2	2	
6. Engineering Economics			**6**
6.1	6	6	
7. Professional practices			
7.1	1	1	**6**
7.2	1	1	
7.3	2	2	
7.4	1	1	
7.5	1	1	
Total	**75**	**75**	**75**

PART-B

FOR SUBJECTIVE QUESTION

Units	Subjective (Short Questions)		Subjective (Long Questions)		Total Marks
	No of Questions	Marks	No of Questions	Marks	
1. Geotechnical Engineering					
1.1	2	10	1	10	**20**
1.2					
1.3					
1.4					
1.5					
1.6					
1.7					
1.8					
2. Highway Engineering					
2.1	2	10	1	10	**20**
2.2					
2.3					
2.4					
2.5					
3. Water Supply and Sanitation Engineering					
3.1	2	10	-	-	**10**
3.2					
3.3					
4. Irrigation Engineering					
4.1	2	10	-	-	**10**
4.2					
4.3					
5. Estimating and Costing					
5.1	1	5	1	10	**15**
5.2					
5.3					
5.4					
Total	**9**	**45**	**3**	**30**	**75**

प्रा.उ.से. सिभिल ईन्जिनियर (खुला) पदको पेशागत विषयको

प्रयोगात्मक परिक्षा

समय: १ घण्टा

पूर्णाङ्क: ५०

उत्तीर्णाङ्क: २५

क्र.सं.	विषयवस्तु शिर्षक	अंक भार	समय
१	Building layout as per drawing	२५	३० मिनेट
२	Setting out simple circular curve	२५	३० मिनेट

समाप्त