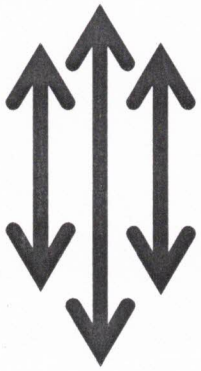
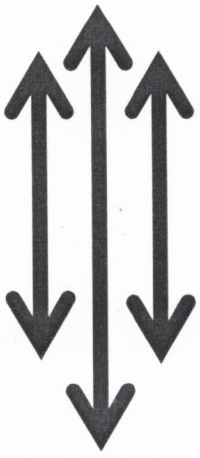
नेपाली सेना
श्री भर्ना छनौट निर्देशनालय, कार्यरथी विभाग,
जंगी अड्डा



प्रा.उ.से. सर्भे (खुला) पदको लिखित परीक्षाको पाठ्यक्रम



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नेपाली सेना

प्रा.उ.से. सर्भे (खुला) पदको लिखित परीक्षाको पाठ्यक्रम

समय: ४ घण्टा

पूर्णाङ्क : १५०
उत्तीर्णाङ्क : ६०

यो पाठ्यक्रम नेपाली सेनाको प्रा.उ.से. सर्भे (खुला) पदको उम्मेदवार छनौट परीक्षाको लागि निर्धारण गरिएको हो । लिखित परीक्षामा सरिक हुने उम्मेदवारहरुको पेशा सम्बन्धी विषयलाई आधारमानी प्रश्नहरु सोधिने छ ।

(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 २०७७/०६/०८ गतेबाट लागु हुनेछ ।

लिखित परीक्षाको योजना र पाठ्यक्रम

विषय	पूर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या अङ्क	समय
पेशा सम्वन्धि	७५	६०	बस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs) ७५	७५ प्रश्न x १ अङ्क=७५	१ घण्टा
	७५		विषयगत (Subjective)	छोटो उत्तर	७ प्रश्न x ५ अंङ्क =३५	३ घण्टा
				लामो उत्तर	४ प्रश्न x १० अङ्क =४०	

नेपाली सेना

प्रा.उ.से. सर्भे (खुला) पदको पेशागत बिषयको लिखित परीक्षाको पाठ्यक्रम

1. Fundamentals of Surveying

1.1 Introduction
- 1.1.1 Historical Background
- 1.1.2 Objectives
- 1.1.3 Principles of surveying
- 1.1.4 Classification
- 1.1.5 Linear and Angular Measurements
- 1.1.6 Survey computations: Bearing, Coordinates, Reduced Level, Area & Volume
- 1.1.7 Units, Standardization and Conversion
- 1.1.8 Application of Surveying
- 1.1.9 Role of International Surveying and Mapping Communities

1.2 Surveying and Mapping Technology
- 1.2.1 Selection, Use, Feasibility, Sustainability, Transfer and Development
- 1.2.2 Instruments, Hardware, Software, Procuring, Maintaining and Upgrading

1.3 Survey Management
- 1.3.1 Surveying Need Assessment
- 1.3.2 Terms of Reference
- 1.3.3 Survey Design, Specification and Costing
- 1.3.4 Tasks, Identification and distribution
- 1.3.5 Tools, Equipment and accessories
- 1.3.6 Checking and Adjusting Instruments
- 1.3.7 Supervision
- 1.3.8 Production
- 1.3.9 Reports
- 1.3.10 Problems of Field Surveying in Nepal
- 1.3.11 Safety Management
- 1.3.12 Professional Ethics, Code and Conduct
- 1.3.13 Community Skill of Surveyor
- 1.3.14 Coordination of Institutional Resources
- 1.3.15 Governmental, Non-Governmental and International Non-Governmental Organization
- 1.3.16 Public Private Partnership
- 1.3.17 User Groups
- 1.3.18 Public Relations

1.4 Statistical Concepts
- 1.4.1 Introduction and Application
- 1.4.2 Measure of Central Tendency: Mean, Median, Mode, Standard Deviation
- 1.4.3 Variance, Co-Variance
- 1.4.4 Correlation and Regression
- 1.4.5 Probability, Normal Distribution

1.5 Error and Adjustments
- 1.5.1 Introduction

1.5.2 Fundamentals of Theory of Measurement Errors
1.5.3 Accuracy and Precision
1.5.4 Least Square Adjustments
1.5.5 Propagation of Errors

2. Cadaster

2.1 Cadastral Surveying
- 2.1.1 Cadastral Concepts
- 2.1.2 Principles of cadastral Surveying
- 2.1.3 Boundaries
- 2.1.4 Parcel
- 2.1.5 Cadastral Survey Methods
- 2.1.6 Cadastral System
- 2.1.7 Cadastral Interface
- 2.1.8 Maintenance of cadaster
- 2.1.9 Land Laws
- 2.1.10 Cadastral Surveys in Nepal

2.2 Land Management
- 2.2.1 Principles of Management
- 2.2.2 Land Development Planning
- 2.2.3 Financial Aspects
- 2.2.4 Land Use
- 2.2.5 Land Management
- 2.2.6 GIS Applications
- 2.2.7 Land Administration

2.3. Land Information System (LIS)
- 2.3.1 Need for LIS
- 2.3.2 Concept of LIS
- 2.3.3 Need for coordination: Structure
- 2.3.4 Parcel based LIS: The Multipurpose Cadaster
- 2.3.5 The Economics of LIS

3. Geodesy

3.1 Introduction to Control Surveying
- 3.1.1 Horizontal Controls
- 3.1.2 Vertical Controls

3.2 Methods of Control Surveying
- 3.2.1 Leveling: Geodetic and Ordinary Leveling
- 3.2.2 Triangulation and Trilateration: Principle, Figure and Strength, Procedures, Computation
- 3.2.3 Traversing: Principle, Procedures, Computation
- 3.2.4 Intersection and Resection: Importance, Procedures, Computation

3.3 Elementary Geodesy and Astronomy
- 3.3.1 Concepts
- 3.3.2 Geodetic Datum and Reference Ellipsoid, Deflection of Vertical, Laplace Equation

3.3.3 Coordinate Systems: Spherical, Geodetic and Astronomical Coordinates
3.3.4 Transformations of Coordinates and Datum Transformation
3.3.5 Celestial Sphere, Celestial Elements, Astronomical Triangle and Time Systems
3.3.6 Astronomical Positioning: Determination of Azimuth, Latitude and Longitude

3.4 Physical Geodesy
3.4.1 Concepts
3.4.2 Gravity Force, Gravity Potential, Measured and Normal Gravity, Gravity Anomaly
3.4.3 Equipotential Surface, Orth metric Height and Dynamic Height
3.4.4 Absolute and Relative Gravimeters

3.5 Global Positioning System
3.5.1 Introduction to Space Geodesy
3.5.2 Principle of Global Positioning System (GPS)
3.5.3 GPS Signals
3.5.4 Satellite Geometry and Accuracy
3.5.5 GPS Positioning
3.5.6 Static and Kinematic Observations
3.5.7 Geocentric Coordinates and WGS 84
3.5.8 GPS Data Processing

4. Photogrammetry and Remote Sensing

4.1 Introduction
4.1.1 Basic Principles of Photogrammetry
4.1.2 Definitions of some terms used in Photogrammetry

4.2 Aerial Camera
4.2.1 Introduction
4.2.2 Parts of Aerial Camera
4.2.3 Types of Camera
4.2.4 Characteristics of Aerial Camera

4.3 Aerial Photography
4.3.1 Types of Aerial Photography
4.3.2 Scale of Aerial Photography
4.3.3 Format of the Photograph
4.3.4 Flight Planning
4.3.5 Aerial Photo Processing
4.3.6 Relief Displacement
4.3.7 Tilt Displacement

4.4 Binocular Vision
4.4.1 Stereoscopic Vision
4.4.2 Pseudoscopic Vision
4.4.3 Anaglyph System
4.4.4 Parallax

4.5 Photo Interpretations
4.5.1 Steps in Photo Interpretation
4.5.2 Elements of Photo Interpretation

4.6 Rectification
- 4.6.1 Introduction
- 4.6.2 Conventional Rectification
- 4.6.3 Differential Rectification
- 4.6.4 Ortho-photo
- 4.6.5 Photo-mosaics

4.7 Photo Control and Aerial Triangulation
- 4.7.1 Selection of Photo Control Points
- 4.7.2 Pre-marking and Post-marking
- 4.7.3 Point Transfer
- 4.7.4 Introduction to aerial Triangulation
- 4.7.5 Phases of Aerial Triangulation
- 4.7.6 Methods of Aerial Triangulation Adjustment

4.8 Analogue Photogrammetry
- 4.8.1 Introduction to Analogue Plotters
- 4.8.2 Types of Stereo Plotters
- 4.8.3 Principles of Stereo Plotters
- 4.8.4 Orientations: Inner, Relative and Absolute Orientation
- 4.8.5 Data Acquisition

4.9 Analytical Photogrammetry
- 4.9.1 Introduction
- 4.9.2 Mathematical relationship between image and object space
- 4.9.3 Spatial Orientation and Measurements

4.10 Digital Photogrammetry
- 4.10.1 Introduction and Concepts
- 4.10.2 Image Acquisition
- 4.10.3 Processing
- 4.10.4 Feature Extraction

4.11 Remote Sensing
- 4.11.1 Introduction
- 4.11.2 Brief History of Remote Sensing
- 4.11.3 Concepts of Satellite Remote Sensing

4.12 Image Processing and Interpretation
- 4.12.1 Geo-referencing
- 4.12.2 Processing: Geometric and Radiometric Processing
- 4.12.3 Image Interpretation and Analysis
- 4.12.4 Errors

5. Engineering Survey

5.1 Introduction
- 5.1.1 Control and Detail Surveys
- 5.1.2 Route Surveying-Plan and Profiles
- 5.1.3 Curves- Types, Geometry Setting out and Application
- 5.1.4 Area and Volume

5.2 Construction Surveys
- 5.2.1 Buildings

5.2.2 Pipelines
5.2.3 Roads and Highways
5.2.4 Tunnels
5.2.5 Hydropower-Intake, Reservoir, Dam, Powerhouse
5.2.6 Bridges
5.2.7 Canals
5.2.8 Transmission Lines
5.2.9 Setting out Surveys

5.3 Hydrographic Surveys
5.3.1 Discharge
5.3.2 Bathymetric Survey

6. Cartography

6.1 Introduction
6.1.1 Historical Background
6.1.2 Scope of Cartography and Earth as a Cartographic Problem
6.1.3 Cartographic Concepts
6.1.4 Conventional and Digital Cartography
6.1.5 Map Production: Map Compilation and Map Reproduction
6.1.6 Topographic Cartography: Large Scale and Base Map
6.1.7 Small Scale mapping
6.1.8 Thematic Cartography

6.2 Geo Information
6.2.1 Data (Geometric and Attribute)
6.2.2 Information & Information System
6.2.3 Geographical Information System (GIS)
6.2.4 Database (Basic Concepts, Design and Principles)

6.3 Data Acquisition, Processing, Analysis, Visualization and Presentation (Conventional and Digital Environments)
6.3.1 Data Acquisition: Data Sources- Maps, Records (Tables, Texts), Digital Data, Ground Surveys, GPS, Aerial Photography, Satellite Imagery, Documents; Toponomy; Digitization
6.3.2 Data Processing: Geo-referencing; Map Projection (Introduction, Classification, Choice and Uses); Data Integration; Editing, Spatial Relationship and Topology; Spatial Analysis (Merge, Buffer Overly); Attribute Database (Topographic and Thematic)
6.3.3 Visualization and Presentation: Spatial and Attribute data; Statistical Surface; Classification of Data; Measurement Level of Data (Nominal, Ordinal, Interval and Ratio); Map design (Principles); Mapping Methods -Symbols; Generalization – conceptual and graphical; Graphic Variables; Typography-Map in and for www (Web Cartography)

6.4 Map Reproduction
6.4.1 Map Reproduction in Conventional Environment - Photography, Copying and Printing
6.4.2 Map Reproduction in Digital Environment

7. Spatial Information System and Digital Terrain Model (SIS and DTM)

7.1 Data Structure, Spatial-Non Spatial Data

- 7.1.1 Vector Data and Raster Data
- 7.1.2 Resolution of Raster Image
- 7.1.3 Object oriented Vector Data
- 7.1.4 Topological Vector Data
- 7.1.5 Data Integration

7.2 Spatial Database Management

- 7.2.1 Introduction
- 7.2.2 Data Modeling
- 7.2.3 Database Design and Maintenance
- 7.2.4 Storage and Archives, Data Security

7.3 Data Standards and Quality

- 7.3.1 Data/Metadata standards: Standardization Format and Accuracy
- 7.3.2 Data quality Administration
- 7.3.3 Copyright

7.4 Geographical Information System (GIS)

- 7.4.1 Introduction to GIS
- 7.4.2 GIS components
- 7.4.3 Data Model
- 7.4.4 GIS Operations and Spatial Analysis

7.5 National Spatial Database Infrastructure

- 7.5.1 Metadata
- 7.5.2 Data Sharing
- 7.5.3 Clearinghouse
- 7.5.4 Spatial Information Service

7.6 Digital Terrain Model (DTM)

- 7.6.1 Introduction
- 7.6.2 Data Collection, Processing and Creation of DTM
- 7.6.3 Storage and Presentation: Triangulated Irregular Network (TIN), Grid and Contours
- 7.6.4 Resolution, Error and Implications
- 7.6.5 Application: Flythrough, View shed, Overlay

7.7 Global Mapping

7.8 Information Communication Technology (ICT) Applications

- 7.8.1 Introduction to Web and Internet
- 7.8.2 Client server computing
- 7.8.3 Data dissemination through web
- 7.8.4 Web Maps: Static, Dynamic and Interactive

8. Act & Rules

- 8.1 Land acquisition Act, 2034
- 8.2 Forest Act, 2076
- 8.3 Environment protection Act, 2076
- 8.4 Environment Protection Regulations, 2077

माथि उल्लेखित पाठ्यक्रमका ईकाईहरुबाट सोधिने प्रश्नहरुको संख्या निम्नानुसार हुनेछ

एकाइ नं. (Unit No.)	अङ्कभार (Weightage)	बहू बैकल्पिक प्रश्न (MCQs) को संख्या	छोटो उत्तर प्रश्नको संख्या	लामो उत्तर प्रश्नको संख्या
1	20	10	-	1
2	20	10	2	-
3	20	10	-	1
4	20	10	2	-
5	20	10	2	-
6	20	10	-	1
7	20	10	-	1
8	10	5	1	-
Total	**150**	**75x1=75**	**7x5=35**	**4x10=40**

प्रयोगात्मक परीक्षाको पाठ्यक्रम

समयः १ घण्टा ३० मिनेट

पूर्णाङ्कः ५०
उत्तिर्णाङ्कः २५

S.N	Topics	Marks	Time (min)
1	Instrument Handling	15	40
2	GIS and Remote Sensing	10	15
3	Hydrological Modeling and Cartography	5	10
4	Practical Knowledge In Subject Matter	10	10
5	Survey Field Work Management	5	5
6	Viva	5	10
	Total	**50**	**90**

समाप्त