

# साप्ताहिक (बुधवार प्रकाशित हुने)

वर्ष २५  
YEAR 25

२०६४ फागुन ८ गते  
FEBRUARY 20, 2008

अंक २६  
NO. 26

## विषयसूची

### उत्तेजवाक्यहरूको विशेष जानकारी

लोक सेवा आयोगका दरखास्त फाराम र पाठ्यक्रम आयोगको केन्द्रीय कार्यालय, क्षेत्रीय निर्देशनालयहरु, अञ्चल कार्यालयहरु र साभा प्रकाशनका शाखा, प्रशाखा मार्फत बिक्री वितरणको व्यवस्था गरिएको छ। यस आयोगबाट तयार भई प्रकाशित फाराम र पाठ्यक्रमहरु मात्र आधिकारिक हुन्।

### १. पाठ्यक्रम

(क) नेपाल इन्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उपसमूह, रा.प. अनं. प्रथम श्रेणी (खुला)

पृष्ठ  
२-६

**पाठ्यक्रम**

नेपाल इञ्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उपसमूह, राजपत्र अनङ्कित प्रथम श्रेणीको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम यस पाठ्यक्रमलाई दुई भागमा विभाजन गरिएको छ।

भाग	परीक्षा	विषय	पूर्णाङ्क	प्रश्न संख्या	समय	परीक्षा प्रणाली	उत्तीर्णाङ्क
१	लिखित	सेवा सम्बन्धी	१००	५०	४५ मिनेट	वस्तुगत बहुउत्तर (Multiple Choice)	४०
२	अन्तर्वार्ता		२०				

१. पाठ्यक्रमका एकाईबाट निम्नानुसार प्रश्नहरू सोधिनेछन्।

Part	I Civil Engineering				II Building				III Architecture		
	१	२	३	४	५	६	७	८	९	१०	११
एकाई											
प्रश्न संख्या	५	७	५	७	३	२	५	३	७	२	४

२. लिखित परीक्षामा गल्ती गरेको प्रश्नोत्तरका लागि २० प्रतिशत अङ्क कट्टा गरिने छ।

३. यस पाठ्यक्रममा जसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ।

४. पाठ्यक्रम लागू हुने मिति २०६४/१९/२

नेपाल इञ्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उपसमूह, राजपत्र अनङ्कित प्रथम श्रेणीको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

**Part I Civil Engineering****1. Drawing****1.1 General**

- 1.1.1 Importance, aims and objectives of drawing
- 1.1.2 Drawing equipments
- 1.1.3 Architectural discipline
- 1.1.4 Standard drawing sheets sizes
- 1.1.5 Drafting techniques and methods in common practice
- 1.1.6 Scales: Choice, use and conversion

**1.2 Measured Drawing**

- 1.2.1 Methods of measurement of horizontal and vertical dimensions
- 1.2.2 Sectional measurements
- 1.2.3 Dimensioning of sketches
- 1.2.4 Checking for missing details in field

**1.3 Working Drawing**

- 1.3.1 Role of working drawing
- 1.3.2 Interrelationship with estimate and specification
- 1.3.3 Construction detailing in plan and section
- 1.3.4 Significance of detailing in terms of accuracy of estimation, bill of quantities and construction supervision

- 1.3.5 Working drawing for private and public buildings, sanitary installation, electrification
- 1.3.6 Structural working drawings

**2. Estimating and Costing****2.1 General**

- 2.1.1 Purpose of estimating
- 2.1.2 Main items of work
- 2.1.3 Units of measurement and payment of various items of work and materials
- 2.1.4 Degree of accuracy
- 2.1.5 Standard estimate formats of Government of Nepal
- 2.1.6 Data for estimate
- 2.1.7 Preliminary estimate
- 2.1.8 Approximate quantity estimate
- 2.1.9 Detailed estimate
- 2.1.10 Revised estimate

**2.2 Rate Analysis**

- 2.2.1 Manufactures' cost
- 2.2.2 Transportation cost
- 2.2.3 Overheads
- 2.2.4 Need for contingencies
- 2.2.5 Use of Government Rate Analysis Norms

**2.3 Specifications**

- 2.3.1 Purpose
- 2.3.2 Types
- 2.3.3 Necessity
- 2.3.4 Interpretation of Specifications

**2.4 Estimating**

- 2.4.1 Earthwork
  - 2.4.2 Estimate of buildings
  - 2.4.3 Estimate of sanitary installations
  - 2.4.4 Estimate of electrical wiring and sanitary works
  - 2.4.5 Annual maintenance
- 2.5 Valuation
  - 2.5.1 Purpose of valuation
  - 2.5.2 Methods of valuation
  - 2.5.3 Standard formats used for Property Valuation in Nepal

**3. Management****3.1 Organization**

- 3.1.1 Need for organization
- 3.1.2 Building agencies
- 3.1.3 Structure of the Department of Urban Development and Building construction
- 3.1.4 Responsibilities of a building sub engineer
- 3.1.5 Relation between owner, contractor and consultants

**3.2 Accounts**

- 3.2.1 Familiarity with related Nepalese accounting system
- 3.2.2 Administrative approval and technical sanction

- 3.3 Planning and Control
  - 3.3.1 List of activities
  - 3.3.2 Construction schedule
  - 3.3.3 Equipment and materials schedule
  - 3.3.4 Construction stages and operations
  - 3.3.5 Bar Chart
- 3.4 Municipal Building By-laws
  - 3.4.1 Sheet sizes
  - 3.4.2 Scales
  - 3.4.3 Setback
  - 3.4.4 Height controls
  - 3.4.5 Other requirements specifies by the municipalities
  - 3.4.6 FAR

#### 4. Building Service

- 4.1 Water Supply
  - 4.1.1 General principle of water supply
  - 4.1.2 Water requirement standard for different buildings
  - 4.1.3 Storage and distribution of water
  - 4.1.4 Heating of water, storage and distribution requirements
- 4.2 Disposal system
  - 4.2.1 Septic tank, soak pit, vent and manhole
  - 4.2.2 Pipes for different sewage
  - 4.2.3 Incinerators
- 4.3 Electricity
  - 4.3.1 General principles of electrical installation and distribution
  - 4.3.2 Wiring systems in private and public building
  - 4.3.3 Ducts for electrical distribution
  - 4.3.4 Safety precautions
- 4.4 Lighting
  - 4.4.1 General principles of lighting
  - 4.4.2 Illumination requirements and standards
  - 4.4.3 Combination of artificial and natural light
  - 4.4.4 Lighting fixtures

#### Part II Building

#### 5. Surveying

- 5.1 General
  - 5.1.1 Primary divisions of survey
  - 5.1.2 Classification based on instruments and on methods
  - 5.1.3 Basic principle of surveying
  - 5.1.4 Scales, plans and maps
  - 5.1.5 System of field booking of surveying and levelling data
  - 5.1.6 Theodolite survey
- 5.2 Levelling
  - 5.2.1 Classification of levelling work
  - 5.2.2 Methods of levelling
  - 5.2.3 Levelling instruments and accessories
  - 5.2.4 Principles of levelling
  - 5.2.5 Temporary and permanent adjustments of a level

- 5.2.6 Profile levelling
- 5.2.7 Booking and reducing levels
- 5.3 Errors and their effects
  - 5.3.1 Kinds of errors
  - 5.3.2 Source of errors in chaining, levelling, plane tabling and compass surveying
  - 5.3.3 Effects of errors
- 5.4 Plane Tabling
  - 5.4.1 Equipments used
  - 5.4.2 Working operations
  - 5.4.3 Methods of plane tabling
  - 5.4.4 Merits and demerits of plane tabling
- 5.5 Contouring
  - 5.5.1 Definitions of terms
  - 5.5.2 Use contour maps
- 5.6 Setting out
  - 5.6.1 Small buildings
  - 5.6.2 Simple curves
  - 5.6.3 Locating the boundaries of farm lands

#### 6. Construction Materials

- 6.1 Stone
  - 6.1.1 Rocks and their characteristics
  - 6.1.2 Formation and availability of stones in Nepal
  - 6.1.3 Quarrying: excavation, Wedging and blasting
  - 6.1.4 Methods of laying and construction with various stones
- 6.2 Aggregates
  - 6.2.1 Fine aggregates
  - 6.2.2 Coarse aggregates
  - 6.2.3 Availability and practice in Nepal
- 6.3 Cement
  - 6.3.1 Different cements: ingredients, properties and manufacture
  - 6.3.2 Storage and transport
  - 6.3.3 Admixtures
- 6.4 Metals and Alloys
  - 6.4.1 Wrought iron: Properties, use
  - 6.4.2 Steel: composition, properties, appearance, strength, constructional forms and manufacture
  - 6.4.3 Corrosion and its prevention
  - 6.4.4 Brass: uses
- 6.5 Brick
  - 6.5.1 Type
  - 6.5.2 Manufacture
  - 6.5.3 Laying
  - 6.5.4 Availability and practice in Nepal
- 6.6 Lime
  - 6.6.1 Manufacture
  - 6.6.2 Types and properties
  - 6.6.3 Uses
- 6.7 Paints and Varnishes
  - 6.7.1 Type and selection
  - 6.7.2 Preparation techniques
  - 6.7.3 Uses

- 6.8 Floor Finishes
  - 6.8.1 Punning
  - 6.8.2 Tiles: mosaic, clay, concrete, vinyl
  - 6.8.3 Marble and flagstones
  - 6.8.4 Woodenboarding and parqueting
- 6.9 Wall Finishes
  - 6.9.1 Plasters: cement, lime, mud
  - 6.9.2 Punning: cement, lime
  - 6.9.3 Cladding: wood, stone, tiles
- 6.10 Roofing Materials
  - 6.10.1 Clay tiles, ceramic tiles and states
  - 6.10.2 CGI and UPVC
- 6.11 Miscellaneous Materials
  - 6.11.1 Glass
  - 6.11.2 Plastics
  - 6.11.3 Asphalt and Bitumen
  - 6.11.4 Surkhi
- 7. Structural Design**
  - 7.1 Timber Structures
    - 7.1.1 Allowable stresses
    - 7.1.2 Design of compression members
    - 7.1.3 Design of solid rectangular beams, design of simple steel beams
    - 7.1.4 Types of joints and their connections
  - 7.2 Steel Structures
    - 7.2.1 Rivetted and welded connections: types, uses, detailing
    - 7.2.2 Detailing of simple roof trusses
    - 7.2.3 Detailing of rolled steel beams
    - 7.2.4 Detailing of column bases
  - 7.3 R.C. Sections in Bending
    - 7.3.1 Basis assumptions
    - 7.3.2 Position of neutral axis
    - 7.3.3 Moment of resistance
    - 7.3.4 Under reinforced, over reinforced and balanced sections
    - 7.3.5 Analysis of singly and doubly reinforced rectangular sections
    - 7.3.6 Analysis of singly reinforced flanged sections
  - 7.4 Shear and Bond for Reinforced Concrete (RC) Sections
    - 7.4.1 Behaviour of R.C. section in shear
    - 7.4.2 Shear resistance of R.C. section
    - 7.4.3 Types of shear reinforcement and their design
    - 7.4.4 Local and anchorage bond
    - 7.4.5 Determination of anchorage length
    - 7.4.6 Bar curtailment
  - 7.5 Axially Loaded R.C.
    - 7.5.1 Short and long columns
    - 7.5.2 Design of a rectangular column section
    - 7.5.3 Reinforcement detailing
  - 7.6 Design and Detailing of R.C Structures
    - 7.6.1 IS code requirements
    - 7.6.2 Methods of design
    - 7.6.3 Singly reinforced T and L beams

- 7.6.4 Simple one-way and two-way slabs
- 7.6.5 Simple pad footings for columns
- 7.6.6 Preparation of bar bending for RC design
- 7.7 Earthquake Resistant Design of Non-engineered Structures
  - 7.7.1 History of Earthquake in Nepal and damages
  - 7.7.2 Weakness of existing building
  - 7.7.3 Site consideration
  - 7.7.4 Building form, shape and size
  - 7.7.5 Size and location of openings
  - 7.7.6 Selection of materials
  - 7.7.7 Construction technology
  - 7.7.8 Seismic resistant components : through stone, vertical and horizontal reinforcement, diaphragm, boxing of building, lateral restrainers, unsupported length of wall, corner and junction of wall/connection of building components
- 8. Building Construction Technology**
  - 8.1 Foundations
    - 8.1.1 Function and necessity
    - 8.1.2 Subsoil exploration: test pit
    - 8.1.3 Safe bearing capacity of soils and its improvement
    - 8.1.4 Type and suitability of different foundations: shallow, deep (pile and well)
    - 8.1.5 Methods of excavating
    - 8.1.6 Shoring and dewatering
    - 8.1.7 Elements of simple spread foundation
    - 8.1.8 Stone masonry foundations
    - 8.1.9 Raft foundation
  - 8.2 Walls
    - 8.2.1 Types of walls: solid wall, partition wall, cavity wall, curtain wall
    - 8.2.2 Features and their functions
    - 8.2.3 Types of stone masonry: rubble, hammer dressed and ashlar masonry
    - 8.2.4 Brick Masonry: English, Flemish, garden rat trap, monk
    - 8.2.5 Types of concrete blocks
    - 8.2.6 Choosing wall thickness, height to length relation
    - 8.2.7 Use of scaffolding
    - 8.2.8 Procedure of constructing various masonry walls
  - 8.3 Damp Proofing
    - 8.3.1 Source of dampness
    - 8.3.2 Remedial measures to prevent dampness
    - 8.3.3 Vertical and horizontal damp proofing
    - 8.3.4 Damp proofing materials

**8.4 Concrete Technology**

- 8.4.1 Constituents, mixing and use of lime concrete
- 8.4.2 Constituents, of cement concrete
- 8.4.3 Grading of aggregates
- 8.4.4 Concrete mixes
- 8.4.5 Water cement ratio
- 8.4.6 Workability
- 8.4.7 Concrete laying
- 8.4.8 Factors affecting strength of concrete
- 8.4.9 Form work
- 8.4.10 Vibrators
- 8.4.11 Curing
- 8.4.12 General introduction to Precast RC units
- 8.4.13 Hydration and segregation

**8.5 Wood Work**

- 8.5.1 Frame and shutters of doors and windows
- 8.5.2 Timber construction of upper floors
- 8.5.3 Design and construction of stairs
- 8.5.4 Double timber roofs
- 8.5.5 False ceiling
- 8.5.6 Sky-light: elements, functions and construction details

**8.6 Steel Work**

- 8.6.1 Steel work in windows: Standards, elements and functions
- 8.6.2 Tubular and angle steel roofs
- 8.6.3 Iron grill and lattice work

**Part III Architecture -Maintenance of building****9. Building Design****9.1 Analysis of Building Elements**

- 9.1.1 Bed
- 9.1.2 Kitchen/Dining
- 9.1.3 Living Hall
- 9.1.4 Class Room
- 9.1.5 Working Office Space
- 9.1.6 Library

**9.2 Design Consideration**

- 9.2.1 Specific program: space requirements
- 9.2.2 Site: topography, orientation, environment
- 9.2.3 Functional relationship between activities
- 9.2.4 Culture: tradition, values, taste
- 9.2.5 Economics: efficient use of space and materials
- 9.2.6 Availability to technology and material
- 9.2.7 Structure type and efficiency
- 9.2.8 Optimum use of natural light and ventilation
- 9.2.9 Aesthetics

**9.3 Climatology**

- 9.3.1 Climate: sun, wind, rain, humidity
- 9.3.2 Orientation of the building with respect to the sun and wind: best, optimum, bad

- 9.3.3 Determination of length of roof projection to act as sunshade

**10. Architectural Modelling****10.1 Modelling Materials and Practices**

- 10.1.1 Use of models
- 10.1.2 Choice of materials
- 10.1.3 Modelling techniques
- 10.1.4 Accuracy of models
- 10.1.5 Determination of degree of detailing
- 10.1.6 Model construction of multi-storey buildings
- 10.1.7 Contour models of sites

**10.2 Equipments Required**

- 10.2.1 Choice of cutting tools
- 10.2.2 Choice of adhesives
- 10.2.3 Choice of colour and tone
- 10.2.4 Choice of paint and brushes
- 10.2.5 Miscellaneous tools

**11. Graphics and presentation****11.1 Principles of Composition**

- 11.1.1 Balance
- 11.1.2 Scale
- 11.1.3 Rhythm
- 11.1.4 Monotony
- 11.1.5 Contrast
- 11.1.6 Unity
- 11.1.7 Focal point

**11.2 Tone**

- 11.2.1 Light
- 11.2.2 Medium
- 11.2.3 Dark
- 11.2.4 Flat
- 11.2.5 Graded

**11.3 Free Hand Works**

- 11.3.1 Drawing lines
- 11.3.2 Drawing letters
- 11.3.3 Three dimensional objects

**11.4 Presentation**

- 11.4.1 Textures
- 11.4.2 Exterior and interior objects
- 11.4.3 Human figures
- 11.4.4 Shadows

**11.5 Medium for Presentation**

- 11.5.1 Pencil techniques
- 11.5.2 Colour history and type: pencil colour, water colour, Poster colour
- 11.5.3 Primary, secondary and tertiary colours
- 11.5.4 Warm and cool colours
- 11.5.5 Properties of colour
- 11.5.6 Colour circle
- 11.5.7 Colour scheme: monochromatic, analogous, complementary and triad

**11.6 Data Presentation in Graphical Forms**

- 11.6.1 Translation of numerical data into diagrams and vice versa
- 11.6.2 Pie chart, bar chart and XY graphs

- 11.7 Cartography  
11.7.1 Tracing of land-use maps  
11.7.2 Presentation of land-use maps

**Sample Questions**

1. Surveying is a process of
  - (a) Finding out area of land
  - (b) Representing the shape and size of the land into maps
  - (c) Locating or transferring design details on to the ground
  - (d) All above
2. An area can be completely defined with the use of linear measurements only, if :
  - (a) Its perimeter is known
  - (b) Its length and breadth is known
  - (c) It is enclosed by a triangle
  - (d) It is enclosed by a traverse whose perimeter can be measured
3. The trusted way of ensuring reliable survey works is:
  - (a) To be sincere and honest
  - (b) To follow the surveying procedure sincerely
  - (c) To take check measurements
  - (d) To get the works checked by seniors
4. Contours are useful for:
  - (a) The calculation of area
  - (b) The calculation of slopes
  - (c) The calculation of volumes of cut and fill
  - (d) the interpretation of land use
5. Errors are the result of
  - (a) A combination of unavoidable imperfections
  - (b) Instrumental problems only
  - (c) Careless works only
  - (d) Surveying procedure only











