लोक सेवा आयोग

नेपाल इन्जिनियरिंग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक उपसमूह, राजपत्र अनंकित द्वितीय श्रेणी, असिष्टेण्ट सव-इन्जिनियर वा सो सरह पदको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

परीक्षा योजना (Examination Scheme)

पाठ्यक्रमको रुपरेखा :– यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छ :

प्रथम चरण	लिखित परीक्षा	पूर्णाङ्क :– १००
द्वितीय चरण	अन्तर्वार्ता	पूर्णाङ्क :– २०

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या हअङ्कभार	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुबैकल्पिक (Multiple Choice)	५० ह २ = १००	४५ मिनेट

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	२०	मौखिक

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. पाठ्यक्रमका सबै एकाईहरुबाट निम्नानुसार प्रश्नहरु सोधिनेछन् :

Part	I Civil Engineering			II Building Material And Building Construction				III Architecture And Planning			
एकाइ	1	2	3	4	5	6	7	8	9	10	11
प्रश्न संख्या	6	8	6	6	6	5	3	2	3	3	2

३. वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरुको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत २ (दुई) अङ्क प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात् ०.४ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

४. यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरु परीक्षाको मिति भन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ ।

५. लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र अन्तर्वार्तामा सम्मिलित गराइनेछ ।

६. पाठ्यक्रम लागू मिति - **२०७०।२।१६ देखि**

PART I Civil Engineering

1. Engineering Drawing

1.1.Preparation of standard drawing sheets: A_O, A_1, A_2, A_3, A_4 size of sheet (length x breadth)

1.2.Drafting techniques and methods in common practice

1.2.1. Different types of lines and effects

1.2.1.1. Vertical line, horizontal line & inclined line (thick, thin, dark, light)

1.2.2. Texture of different materials: stone, timber, glass, metal, brick, concrete, sand, earth, tile, plaster e.t.c.

1.2.3. Dimensioning : element to element, centre to centre & overall dimensioning

1.3.Measured Drawing

1.3.1. Methods of measurement of horizontal and vertical dimensions

1.3.2. Sectional measurements

1.3.3. Scales: choice, use and conversion

1.4.Working Drawing

1.4.1. Significance of detailing in terms of accuracy of estimation, bill of quantities and construction supervision

1.4.2. Working drawing for private and public buildings, sanitary installation and electrification

1.4.3. Structural working drawings and structural detail: column, beam, slab, foundation, and other structural elements

2. Estimating and costing

2.1.General

2.1.1. Purpose of estimating

2.1.2. Units of measurements and modes of payment of various items of work and materials

2.1.3. Standard estimate formats of government of Nepal

2.1.4. Methods of estimate

2.1.5. Preparation of detail estimate and abstract of cost

2.1.6. Types of estimates (preliminary estimate, approximate quantity estimate, detailed estimate, revised estimate e.t.c.)

2.2.Rate analysis and Norms

2.2.1. Approved district rate of materials

2.2.2. Transportation cost of materials, labour charge, vehicles and others

2.2.3. Need for contractors overheads

2.2.4. Need for VAT and contingencies

2.2.5. Standard Rate analysis and Norms

2.3. Specifications

2.3.1. Purpose, types and necessity

2.3.2. Understanding of specifications

2.3.3. Standards specifications of building

2.4. Estimating

2.4.1. Estimate of civil works, and site development work

2.4.2. Estimate of water supply, sanitary installations

2.4.3. Estimate of Electrification works

2.4.4. Estimate of repair and maintenance

2.4.5. Use of spread sheet for estimating and costing

2.5. Valuation: Concept and purpose of property valuation

3. Surveying

3.1. General
- 3.1.1. Introduction and its importance
- 3.1.2. Classifications based on instruments and on surveying methods
- 3.1.3. Basic principle of surveying
- 3.1.4. Scale, plans, maps
- 3.1.5. Conventional signs and system of field booking of surveying and levelling the survey data
- 3.1.6. Uses of ranging rods, arrows and bench marks
- 3.1.7. Linear measurements: chain, tape & steel band
- 3.1.8. Abney level

3.2. Levelling
- 3.2.1. Classification of levelling works
- 3.2.2. Methods of levelling
- 3.2.3. Levelling instruments and accessories
- 3.2.4. Principles of levelling
- 3.2.5. Temporary and permanent adjustments of a level
- 3.2.6. Profile levelling
- 3.2.7. Booking and reducing levels,
- 3.2.8. Errors and its adjustment

3.3. Chain survey
- 3.3.1. Principles
- 3.3.2. Detail, offsets, ties
- 3.3.3. Setting 3,4,5 right triangle
- 3.3.4. Use of isosceles triangle
- 3.3.5. Sources of error, limitations of scale and accuracy
- 3.3.6. Plotting and use of base lines.

3.4. Contouring : definition & use of contour maps

3.5. Setting out : buildings & locating the boundaries of lands

3.6. Organization and management
- 3.6.1. Definition of organization and its importance
- 3.6.2. Building agencies: DUDBC, Municipality, Town development Authority e.t.c.
- 3.6.3. Organizational Structure of the Department of Urban Development and Building Construction (DUDBC)
- 3.6.4. Responsibilities of Assistant sub-Engineer.

<u>Part-II Building Material and Building Construction</u>

4. Building construction technology

4.1. Foundation
- 4.1.1. Types of foundation: shallow, deep
- 4.1.2. Safe bearing capacity of soil and its improvement
- 4.1.3. Methods of excavation, shoring and dewatering
- 4.1.4. Stone/brick masonry foundation
- 4.1.5. Isolated, combined and raft foundation
- 4.1.6. Strap beam, foundation beam and DPC beam

4.2. Damp proofing
- 4.2.1. Source of dampness
- 4.2.2. Remedial measures to prevent dampness
- 4.2.3. Vertical and horizontal damp proofing
- 4.2.4. Damp proofing materials and their application methods

4.3. Walls
- 4.3.1. Types of walls: solid wall, partition wall, cavity wall, curtain wall
- 4.3.2. Types of stone masonry: rubble, dressed, ashlar
- 4.3.3. Brick masonry: English bond, Flemish bond, Rat-Trap bond etc.
- 4.3.4. Concrete block: Hollow block, Solid Block etc.
- 4.3.5. Seismic resistant features in wall: corner strengthening, Plinth band sill band, lintel band, gable band, vertical reinforcement, through stone.

4.4. Concrete technology and management
- 4.4.1. Constituents of cement concrete(cement, aggregate, water, admixture)
- 4.4.2. Grading of aggregates
- 4.4.3. Water cement ratio
- 4.4.4. Workability and strength of concrete
- 4.4.5. Concrete mix, laying, pouring, and compaction
- 4.4.6. Reinforcement laying
- 4.4.7. Formwork
- 4.4.8. Curing of concrete
- 4.4.9. Storage and management of construction material
- 4.4.10. Record keeping at construction site (daily work done, manpower mobilized, material storage etc)
- 4.4.11. Construction safety
- 4.4.12. Scheduling tool(bar chart)

4.5. Doors and windows
- 4.5.1. Types of timber door and windows
- 4.5.2. Types of timber pannel, frame and shutters
- 4.5.3. Other materials (Aluminium, UPVC, PVC, Metal etc.)
- 4.5.4. Joinery details

4.6. Staircase : Types (Dog Legged, openwell, straight flight) & layout of staircase

5. Construction Material

5.1. Rocks/stone: types of rocks, their characteristics & properties of good stone

5.2. Aggregates (fine & coarse)

5.3. Cement
- 5.3.1. Different types of cement and its properties
- 5.3.2. Admixtures

5.4. Metal and alloys
- 5.4.1. Steel: composition and properties
- 5.4.2. Corrosion and its prevention

5.5. Brick: types of bricks & sizes of bricks available in Nepal

5.6. Lime and Surkhi: types, properties and its uses.

5.7. Mortar: types, properties and its uses along with proportions

5.8. Paints and varnishes : constituents, types and its uses

5.9. Finishes
- 5.9.1. Floor finishes-punning, tiles, mosaic, clay, concrete, vinyl, marble, flagstones, wooden boarding, parquet etc.
- 5.9.2. Wall finishes : plasters (cement, lime and mud), punning and cladding (wooden, stone, tiles, marbles)

5.10. Roofing materials
- 5.10.1. Clay tiles, ceramic tiles and slates
- 5.10.2. Sheet-C.G.I. and UPVC, Fiber glass
- 5.10.3. Water proofing materials
- 5.10.4. Application aspects.

6. Structural Details and Its Interpretation

6.1. Clear cover for structural elements (slab, beam, column, foundation, shear wall, staircase)
6.2. Development length for different grade of concrete and reinforcement
6.3. Detailing of stirrups and ties
6.4. Detailing of beam -column joint
6.5. Rebar schedule
6.6. Lapping zone for different structural elements.

7. Building Services

7.1. Water supply
  7.1.1. Necessity of water supply
  7.1.2. Types of storage (underground, overhead)
  7.1.3. Types of water supply pipes and its fitting
7.2. Disposal system
  7.2.1. Septic tank, soak pit, vents, manhole
  7.2.2. Rain water harvesting (Recharging system)
  7.2.3. Types of sewerage pipes
7.3. Electricity
  7.3.1. General principle of electrical installation and distribution
  7.3.2. Types of wiring systems (surface, conceal)
  7.3.3. Safety precautions (earthing, lightening arrestors)
7.4. Lighting : General principle of lighting & Lighting fixtures

<u>Part III Architecture and Planning</u>

8. Elements of building (components)

8.1. Walls (load bearing and frame structure)
8.2. Floors
8.3. Opening (doors and windows)
8.4. Connecting elements (staircase/ramps/elevators/Escalators)

9. Synthesis of components into a total building

9.1. The specific programme- space requirements
9.2. Site topography (flat/slope) and surroundings
9.3. Orientation and climatic elements (sun, wind, Precipitation, humidity and its relationship with orientation)
9.4. Culture tradition, values, introduction to vernacular architecture
9.5. Natural light and natural ventilation (skylight/atrium)
9.6. Sun-shading (Horizontal, Vertical and Egg-crate) devices and its uses

10. Planning

10.1. Building byelaws: Setback, Floor area ratio (FAR), Ground coverage, Right of way (ROW) and Height controls;
10.2. Building Code: Introduction, its types & uses
10.3. Concepts of land development
  10.3.1. Definition of guided land development
  10.3.2. Definition site and services
  10.3.3. Land pooling

11. Medium for presentation

11.1. Pencil techniques
11.2. Colour-primary, secondary, tertiary, colour wheel
11.3. Computer application in building drawing(AutoCAD)

Model questions

1. The standard size of A0 sheet size paper in mertic system are
   A. 841x1189mm B. 825x1175mm
   C. 820x1150mm D. 835x1180mm
2. The texture of brick is illustrated graphically as
   A.  B. 
   C. D. 
3. The horizontal sunshading devices used for controlling
   A. High sun angle. B. Low sun angle
   C. Both high and low D. horizontal shadow angle
4. The dimensioning method given in a drawing of certain objects
   A. element to element B. centre to centre
   C. overall dimension. **D. All of the above**
5. In engineering drawing, the light tone is done by
   A. (H ,2H ,3H) grade pencil. B. HB grade pencil
   C. 2B, 3B grade pencil D. 2B, HB grade pencil
6. The FAR is defined as the ratio of
   A. total floor areas of a building to the site area.
   B. Total floor area of a building to the ground floor.
   C. Site area of a building to total floor area.
   D. Ground floor to the site area.
7. The primary colors are
   A. Red ,Green and Blue. B. white, red and black
   C. Purple, blue and pink D. Black, white and red
8. In city area, the approval of design drawing in …… is mandatory before the construction of buildings.
   A. Municipality B. VDC
   C. Both D. None of above
9. The lower level of window where it rests is called……in a building.
   A. Lintel level B. Sill level
   C. Ceiling level D. None of above
10. What is the standard Size of A3 paper?
    A. 420mmx297mm B. 210mmx297mm
    B. 297mmx350mm D. 420mmx420mm
11. Chaukhat of Doors and Windows are measured in which Unit?
    A. Running Meter B. Square Meter
    C. Cubic Meter D. None of the above
12. Principle of Surveying is?
    A. Working from whole to parts B. Working from parts to whole
    C. Working from one level to another level D. All of the above
13. What is the compressive strength of first class brick?
    A. 0.5 N/mm2 B. 2 N/mm2
    B. 3.5 N/mm2 D. 7 N/mm2

14. What should be the minimum clear cover provided in beam?
    A. 15mm **B. 25mm**
    C. 40mm D. 50mm
15. What is the initial setting time of OPC cement?
    A. 30minutes B. 45minutes
    C. 1 hour D. 2 hours
16. Where bars in column should be lapped in a building?
    A. Within 1/4th of effective height **B. Middle of the floor height**
    C. Within 2/3 Height of effective height D. In Beam- Column Junction
17. What is the minimum thickness of plaster in stone masonry wall?
    A. 10mm B. 12.5mm
    C. 20mm D. 50mm
18. What is the ratio of nominal M20 concrete?
    A. 1:3:6 B. 1:2:4
    C. 1:1.5:3 D. 1:1:2
19. What is the minimum Hook Length to be provided in stirrup?
    A. 20mm B. 50mm
    C. 75mm D. 100mm