पाठ्यक्रमको रुपरेखा :- यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिङ्नेछ:

प्रथम चरण

<table>
<thead>
<tr>
<th>विषय</th>
<th>पूर्णाङ्क</th>
<th>उत्तराङ्क</th>
<th>परीक्षा प्रारूप</th>
<th>प्रश्न संख्या हवाल्लहार</th>
<th>समय</th>
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<tr>
<td>सेवा सम्बन्धी</td>
<td>100</td>
<td>40</td>
<td>वस्तुनिष्ठ व्यवहारकल्पिक (Multiple Choice)</td>
<td>50 ह २ = १००</td>
<td>४५ मिनेट</td>
</tr>
</tbody>
</table>

द्वितीय चरण

<table>
<thead>
<tr>
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<th>परीक्षा प्रारूप</th>
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</thead>
<tbody>
<tr>
<td>व्यक्तिगत अन्तर्वार्ता</td>
<td>२०</td>
<td>मौखिक</td>
</tr>
</tbody>
</table>

१. लिखित परीक्षामा माध्यम भाषा नेपाली वा अङ्ग्रेजी अथवा नेपाली र अङ्ग्रेजी दुबै हुन सक्नेछ।

२. पाठ्यक्रमका सबै एकाइहरूको निम्नानुसार प्रश्नहरू संबिधिनेछन्:

<table>
<thead>
<tr>
<th>Part</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering</td>
<td>Building Material And Building Construction</td>
<td>Architecture And Planning</td>
<td></td>
</tr>
<tr>
<td>एकाइ</td>
<td>१</td>
<td>२</td>
<td>३</td>
</tr>
<tr>
<td>प्रश्न संख्या</td>
<td>६</td>
<td>८</td>
<td>६</td>
</tr>
</tbody>
</table>

३. वस्तुनिष्ठ व्यवहार (Multiple Choice) प्रश्नहरूको उत्तर सही दिएमा प्रत्येक सही उत्तर वापर २ (दुई) अङ्क प्रदान गरिएको भने गन्त उत्तर दिएमा प्रत्येक गन्त उत्तर वापर २० प्रतिशत अर्थात ०.५ अङ्क कोणौं गरिएको तर उत्तर नैदिनीमा व्यापक वापर अङ्क दिइने छैन र अङ्क कोणौं पत्रि गरिएको छैन।

४. यस पाठ्यक्रममा जसै लेखकहरूले भएका पत्र पाठ्यक्रममा पर्ने एन, निम्नहरू परीक्षाको मिति भन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा धरा गरी संशोधन भई) कायम रहेकोलाई यस पाठ्यक्रममा रहेको सम्बन्ध पर्दछ।

५. लिखित परीक्षाको छाती मध्ये एकाइहरूबाट उपमेयसहरूलाई मा अन्तर्वातित ममिलित गराइएको छ।

६. पाठ्यक्रम लागू मिति - २०७०/२/१६ देखि
PART I Civil Engineering

1. Engineering Drawing
   1.1. Preparation of standard drawing sheets: A0, A1, A2, A3, A4 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.

Part-II Building Material and Building Construction

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 panel, 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, lightning arrestors)
   7.4. Lighting: General principle of lighting & Lighting fixtures

**Part III Architecture and Planning**

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 metric system are
   A. 841x1189mm  
   B. 825x1175mm  
   C. 820x1150mm  
   D. 835x1180mm

2. The texture of brick is illustrated graphically as
   A.  
   C.  
   B.  
   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  
    C. 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  
    C. 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