नेपाल सरकार  
नेपाल भाषा अनुसारित परिषद  
पदपूर्ति समिति  

ईञ्जिनियर, टि-६ पद/तहको खोला तथा आन्तरिक प्रतियोगितामध्ये लिखित परीक्षाको पाठ्यक्रम एवं परीक्षा योजना  

यस पाठ्यक्रम योजनालाई दुई शरणमा विभाजन गरिएको छ।  

प्रथम चरण: लिखित परीक्षा (Written Examination)  
द्वितीय चरण: अन्तर्वार्ता (Interview)  

पूर्णाङ्क: ३०  

<table>
<thead>
<tr>
<th>पद</th>
<th>विषय</th>
<th>पूर्णाङ्क</th>
<th>द्वितीय अंक</th>
<th>परीक्षा प्राप्तिली</th>
<th>प्रश्न संख्या x अंक</th>
<th>समय</th>
</tr>
</thead>
<tbody>
<tr>
<td>प्रथम</td>
<td>सिमिल इञ्जिनियरीक सामग्री</td>
<td>१००</td>
<td>६०</td>
<td>वस्तुगत</td>
<td>५० प्रश्न x २ अंक = १०० बहुविकल्पक प्रश्न (MCQs)</td>
<td>४५ मिनेट</td>
</tr>
</tbody>
</table>
| द्वितीय | जनरल विषय सामग्री | १०० | ६० | विषयगत | ८ प्रश्न x ५ अंक = ४० (छोटो उत्तर)  
 ६ प्रश्न x १० अंक = ६० (लामो उत्तर) | ३ घण्टा |

<table>
<thead>
<tr>
<th>पदपूर्ति समिति</th>
<th>पूर्णाङ्क</th>
</tr>
</thead>
<tbody>
<tr>
<td>अन्तर्वार्ता (Interview)</td>
<td>३०</td>
</tr>
<tr>
<td>द्वितीय अंक</td>
<td>मौखिक</td>
</tr>
</tbody>
</table>

प्रश्न:  
१. यो पाठ्यक्रम योजनालाई प्रथम चरणमा लिखित परीक्षा र द्वितीय चरणमा अन्तर्वार्ता परीक्षा गर्न सुझावित र दुई जुनीहरू र मन्त्रालय नियममा अनुसार परीक्षा गरिएको छ।  
२. प्रयासक र लेखक समूहको समान पद/तहको सामान्य शान र सामान्य अध्ययन खण्ड (क) र पाठ्यक्रम एउटै भएको कारण एककार्यकरता परीक्षा सञ्चालन गरिएको छ।  
३. बहुविकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिन्छ एवं प्रष्ट गलत उत्तर गर्न सहयोग र बघेको बात २० प्रश्नहरूको अंक कहाँ गरिएको छ।  
४. बहुविकल्पिक प्रश्नहरूको हेर्ने र जुनीहरूको सम्बन्धित उपकरण र चेतन गर्ने नैसर्गिक ।  
५. बहुविकल्पिक प्रश्न (MCQs) को नेत्रलय एक उत्तर प्रश्नहरूहरूको हुनेछ। विषयविषयक प्रश्नहरूको हकीम दुई बज्या (Short Answer को लागि एक र आगे लागि Long Answer को लागि एक) उत्तरपूर्तिकार्य हुनेछ।  
६. प्रश्नहरूमा उत्तर जानकारीको तर्फबाट उत्तरपूर्तिकार्य हुनेछ। परीक्षाबाट प्रश्नहरूको हकीम दुई बज्या (Short Answer को लागि एक र आगे लागि Long Answer को लागि एक) उत्तरपूर्तिकार्य हुनेछ।  
७. यस पाठ्यक्रम योजनालाई अन्तर्वार्ता परीक्षा र विषयविषयक विषयविषयक जुनीहरूको भएको भएको भएको परीक्षा प्रकार २, तर, नियम, नियम र नामांकन परीक्षाको निर्धारण भन्दा ३ महिना अगाडि (साझेदारी भएको र साझेदारी भएको हरू हटाइएका र बाह्य गरी संशोधन भएका) कारण रहेकाछौं। यस पाठ्यक्रमको परीको सम्पन्न पद्धार्म।  
८. प्रथम चरणको लिखित परीक्षाको छौटिट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वार्ता परीक्षा सम्मिलित गरिएको छ।  
९. प्रथम चरणको लिखित परीक्षाको छौटिट भएका उम्मेदवारहरूलाई पाठ्यक्रम र द्वितीय चरणको अन्तर्वार्ता प्राप्त गर्नका लागि जोडी योग्यताक्रमको अनुसार लिखित परीक्षा गरिएको छ।  
१०. पाठ्यक्रम लागै निर्देश:  
११. यस भन्दा अगाडि लागू भएको पाठ्यक्रमको लिखित परीक्षा गरिएको छ।
1. **Structure Analysis and Design**
   1.1 Stresses and strains; 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 structures: 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, column bases, Design principles on timber beams and columns

2. **Construction Materials**
   2.1 Properties of building materials: physical, chemical, constituents, thermal
   2.2 Stones-characteristics and requirements of stones as a building materials
   2.3 Ceramic materials: ceramic tiles, Mosaic Tile, brick types 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: Asphalitic materials (Asphalt, Bitumen and Tar); paints and varnishes; polymers
   2.8 Soil properties and its parameters

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
   3.6 High strength concrete
   3.7 Pre-stressed concrete technology

4. **Construction Management**
   4.1 Construction scheduling and planning: network techniques (CPM,PERT) and bar charts
   4.2 Contractual procedure and management: types of contract, tender and tender notice, preparation of bidding (tender) document, contractors pre-qualification, evaluation of tenders and selection of contractor, contract acceptance, condition of contract; quotation and direct order, classifications of contractors; dispute resolution
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. Estimating and Costing, Valuation and Specification
5.1 Types of estimates and their specific uses
5.2 Methods of calculating quantities
5.3 Key components of estimating norms and rate analysis
5.4 Preparation of bill of quantities
5.5 Purpose, types and importance of specification
5.6 Purpose, principles and methods of valuation

6. Drawing Techniques
6.1 Drawing sheet composition and its essential components
6.2 Suitable scales, site plans, preliminary drawings, working drawings
6.3 Theory of projection drawing: perspective, orthographic and axonometric projection; first
   and third angle projection
6.4 Drafting tools and equipments
6.5 Drafting conventions and symbols
6.6 Topographic, electrical, plumbing and structural drawings
6.7 Techniques of free hand drawing

7. Engineering Survey
7.1 Introduction and basic principles
7.2 Linear measurements: techniques; chain, tape, ranging rods and arrows; representation of
   measurement and common scales; sources of errors; effect of slope and slope correction;
   correction for chain and tape measurements; Abney level and clinometers
7.3 Compass and plane table surveying: bearings; types of compass; problems and sources of
   errors of compass survey; principles and methods of plane tableing
7.4 Leveling and contouring: Principle of leveling; temporary and permanent adjustment of
   level; bench marks; booking methods and their reductions; longitudinal and cross
   sectioning; reciprocal leveling; trigonometric leveling; contour interval and characteristics
   of contours; methods of contouring
7.5 Theodolite traversing: need of traverse and its significance; computation of coordinates;
   adjustment of closed traverse; closing errors
7.6 Uses of Total Station and Electronic Distance Measuring Instruments

8. Engineering Economics
8.1 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
9. **Professional Practices**

9.1 Ethics and professionalism: code of conduct and guidelines for professional engineering practices
9.2 Nepal Engineering Council Act, 2055 and regulations, 2056
9.3 Relation with clients, contractor and fellow professionals
9.4 Public procurement practices for works, goods and services and its importance

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**Section (A)**

1. **Transportation and Roads**

1.1 Transportation system and its classification
1.2 Transportation planning: rationale, types and its philosophy
1.3 Road transport and road construction in Nepal
1.4 Classification of roads in Nepal (NRS and IRC)
1.5 General principles of road network planning
1.6 Feasibility study of road projects
1.7 Alignment, engineering survey and its stages
1.8 Geometric design of roads: map study, element of cross-section and highway alignment, design of horizontal curve, superelevation, transition curve, vertical curves, right of way
1.9 Drainage consideration in roads:
   1.9.1 Introduction and design of culverts and minor bridges, cross drainage structures, sub surface drainage system
1.10 Special consideration in Hill roads design:
   1.10.1 Problems associated with hill roads construction
   1.10.2 Route location, hairpin bends and special structures
1.11 Road Pavement: Types of pavement and their applicability in hill roads, Design of pavement
1.12 Bioengineering practices along hill side
1.13 Activities and techniques in road construction in rural roads
1.14 Maintenance, repair and rehabilitation of roads
1.15 Role of social mobilization in rural road development
1.16 Low-cost road construction

2. **Housing, Building and Urban Planning:**

2.1 Present status and practices of building construction in Nepal
2.2 Specific considerations in design and construction of buildings in Nepal
2.3 Indigenous technology in building design and construction
2.4 Local and Modern building construction material in Nepal
2.5 Community buildings: School and hospital buildings and their design considerations
2.6 Urban planning needs and challenges in Nepal
Section (B)

1. **Water Supply and Sanitation**
   1.1 Rural and community based water supply system
   1.2 Water supply sources and their management
      1.2.1 Surface water
      1.2.2 Ground water
   1.3 Selection of source
   1.4 Water quality and treatment, water demand and supply, source protection
   1.5 Intakes, collection chamber and break pressure tanks
   1.6 Reservoir and distribution system
   1.7 Intakes, Pipeline design, design of transmission and distribution system, reservoir design
   1.8 Pipe and fittings: Pipe materials, pipe laying and fittings
   1.9 Operation and maintenance of water supply systems
   1.10 Sanitation, waste water and solid waste management:
      1.10.1 On-site sanitation system
      1.10.2 Types of sewerage system, design and construction of sewers
      1.10.3 Types, characteristics, sources, quantity, generation, collection, transportation and
disposal of solid wastes
      1.10.4 Sanitary landfill, incineration, composting
   1.11 Environmental health engineering - Epidemiology, pathogens (Bacteria, Virus, Helminthes, Protozoa)

2. **Irrigation**
   2.1 Status of irrigation development in Nepal
   2.2 Methods of irrigation and their suitability
   2.3 Operation and maintenance of irrigation systems
   2.4 Management of Farmers managed irrigation system
   2.5 Preventive and remedial measures of water logging
   2.6 Flood control, its necessity and flood mitigation measures

3. **NARC General:**
   3.1 NARC Act and Administration and Financial By-Laws
   3.2 Public Procurement Act/Regulations

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