प्रदेश लोक सेवा आयोग, मधेश प्रदेश
इञ्जिनियरिङ्ग सेवा, सिभिल समूह, जनरल उप-समूह, सहायक पाचौँ, ल्याब टेक्निसियन पदको
खुला तथा अन्तर सेवा प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

परीक्षा योजना **(Examination Scheme)**

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

लिखित परीक्षा	पूर्णाङ्क :– १००
अन्तर्वार्ता	पूर्णाङ्क :– २०

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या X अङ्कभार	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुउत्तर (Multiple Choice)	५० X २ = १००	४५ मिनेट

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	२०	मौखिक

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंगजी अथवा नेपाली र अंगजी दुवै हुन सक्नेछ।
२. पाठ्यक्रमकका निम्न एकाइहरुबाट निम्नानसार प्रश्नहरु साधिनेछन :

Part	I Civil Engineering			II Highway Engineering				II Laboratory Testing					
एकाइ	१	२	३	४	५	६	७	८	९	१०	११	१२	१३
पश्न सख्या	३	४	५	३	२	४	६	३	३	५	४	४	४

३. वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरुका उत्तर सही दिएमा प्रत्येक सही उत्तर बापत २ (दुई) अंङ्क प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात ०.४ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन् र अङ्क कट्टा पनि गरिने छैन् ।
४. लिखित परीक्षावाट छनौट भएकाहरुलाई मात्र अन्तर्वार्तामा समावेश गराइनेछ ।
५. पाठ्यक्रम लागू मिति :२०७९।०६।२७ गते देखि ।

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खुला तथा अन्तर सेवा प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

Part I - Civil Engineering

1. Estimating and Costing

1.1 Specifications
1.1.1 Definition, Purpose, Types, Necessity
1.1.2 Specification for Road Works Embankment construction, Sub-grade, Sub-bases, Surface dressing using hot bitumen (two coats), Premix carpet with hot bitumen, Cement concrete pavement

2. Construction Management
- 2.1 Organization
  - 2.1.1 Need for organization
  - 2.1.2 Responsibilities of a Lab Technician
  - 2.1.3 Relation between Client, Contractor and Consultant
- 2.2 Labour Management and Occupational Health and Safety
  - 2.2.1 Organizing crew
  - 2.2.2 Accident prevention
- 2.3 Planning and Control
  - 2.3.1 Construction schedule
  - 2.3.2 Equipment and materials schedule
  - 2.3.3 Construction stages and operations
  - 2.3.4 Bar chart

3. Soil Mechanics

- 3.1 General
  - 3.1.1 Soil types and classification
  - 3.1.2 Three phase system of soil
  - 3.1.3 Unit Weight of soil mass: bulk density, saturated density, submerged density and dry density
  - 3.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air, voids air content and density index
- 3.2 Compaction of soil
  - 3.2.1 Factors affecting soil compaction
  - 3.2.2 Optimum moisture content
  - 3.2.3 Relation between dry density and moisture content
- 3.3 Shear Strength of Soils
  - 3.3.1 Mohr-Coulomb failure theory
  - 3.3.2 Cohesion and angle of internal friction
- 3.4 Foundation Engineering
  - 5.6.1 Terzaghi's general bearing capacity formulas and their application

प्रदेश लोक सेवा आयोग, मधेश प्रदेश

इञ्जिनियरिङ्ग सेवा, सिभिल समूह, जनरल उप-समूह, सहायक पाचौँ, ल्याब टेक्निसियन पदको खुला तथा अन्तर सेवा प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

Part II- Highway Engineering

4. General
   - 4.1 Introduction to transportation systems
   - 4.2 Historic development of roads
   - 4.3 Classification of road in Nepal
   - 4.4 Basic requirements of road alignment
   - 4.5 Province no. 2 Province civil service Act 2077
   - 4.6 Province no. 2, Engineering releted Act, Rules and Regulations.

5. Geometric Design
   - 5.1 Use of Nepal Road Standard, 2027(First Revision 2045) and subsequent revision in road design

6. Highway Materials
   - 6.1 Highway Construction Materials
     - 6.1.1 Mineral Materials, Binding Materials and materials of general construction purpose (stone, cement, bitumen and bricks)
   - 6.2 Sub-grade soil
     - 6.2.1 Suitability, Classification
   - 6.3 Stone aggregate
     - 6.3.1 Types, properties
   - 6.4 Binding Materials (Bitumen)
     - 6.4.1 Types, suitability
   - 6.5 Steel and Gabion wires
     - 6.5.1 Types, suitability

7. Road Pavements
   - 7.1 Definition, types, pavement structures (sub-grade, sub-base, base and wearing courses)
   - 7.2 Road Machineries (Introduction, types, different compacting equipments)
   - 7.3 Road Construction Technology
     - 7.3.1 Introduction, works involved in road construction earthwork, drainage and protection work, pavement work, miscellaneous works
     - 7.3.2 Construction material, equipment and procedure for construction of Earthen roads
     - 7.3.3 Construction material, equipment and procedure for construction of Graveled roads
     - 7.3.4 Construction material, equipment and procedure for construction of Soil Stabilized roads
     - 7.3.5 Construction material, equipment and procedure for construction of WBM roads
     - 7.3.6 Construction material, equipment and procedure for construction of Bituminous roads, Surface Dressing (Single and Double)
     - 7.3.7 Construction material, equipment and procedure for construction of Grouted or penetration macadam
     - 7.3.8 Construction material, equipment and procedure for construction of Otta seal surfacing

Part III - Laboratory Testing

8. Earth work: Laboratory Testing procedure and equipments for
   - 8.1 Gradation, Identification
   - 8.2 Proctor compaction (Optimum moisture content & Maximum dry density)
   - 8.3 Plasticity Index
   - 8.4 Dynamic cone penetration
   - 8.5 California Bearing Ratio (CBR)
   - 8.6 Specific gravity

9. Sub-base/base: Laboratory Testing procedure and equipments for
   - 9.1 Gradation, Material identification
   - 9.2 Compaction (Maximum dry density & Optimum moisture content)
   - 9.3 California Bearing Ratio (CBR)
   - 9.4 Compaction-Field density test by sand replacement method/core cutter method
   - 9.5 Los-Angeles abrasion
   - 9.6 Aggregate impact value
   - 9.7 Aggregate crushing value

10. Pavement
    - 10.1 Aggregate: Laboratory Testing procedure and equipments for
      - 10.1.1 Los-Angeles abrasion
      - 10.1.2 Aggregate Impact value
      - 10.1.3 Aggregate crushing value
      - 10.1.4 Bitumen stripping value
      - 10.1.5 Flakiness Index
      - 10.1.6 Gradation
    - 10.2 Bitumen: Laboratory Testing procedure and equipments for
      - 10.2.1 Penetration
      - 10.2.2 Flash/Fire point test
      - 10.2.3 Specific gravity test
      - 10.2.4 Water content test
      - 10.2.5 Solubility test
      - 10.2.6 Ductility test
      - 10.2.7 Penetration of Residue after loss heating
      - 10.2.8 Softening point test
      - 10.2.9 Viscosity
      - 10.2.10 Loss on heating

11. Cement Concrete: Laboratory Testing procedure and equipments for
    - 11.1 Normal consistency of cement
    - 11.2 Setting time of cement
    - 11.3 Compression test of cement mortar cube
    - 11.4 Slump test
    - 11.5 Compression test of concrete
    - 11.6 Gradation of sand & Aggregates
    - 11.7 Fineness modulus of sand
    - 11.8 Clay in sand

11.9 Concrete mix design

12. Steel reinforcement and Gabion wire: Laboratory Testing procedure and equipments for
    12.1 GI wire
        12.1.1 Zinc coating test
        12.1.2 Tensile strength test
        12.1.3 Uniformity test
        12.1.4 Adhesion test

    12.2 Steel reinforcement Bars
        12.2.1 Yield and ultimate tensile strength
        12.2.2 Elongation

13. Laboratory and Field Test
    13.1 Benkelman's Beam test
    13.2 Surface distress Index
    13.3 Road Roughness Index
    13.4 Sampling Techniques of construction materials for highway and bridge works
    13.5 Quality Assurance Plan
    13.6 Quality control for Road and Bridge works

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