प्रदेश लोक सेवा आयोग, बागमती

नेपाल इन्जिनियरिङ्ग सेवा, सिभिल समूह अन्तर्गतका पाँचौं तहको ल्याब टेक्निसियन पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

परीक्षा योजना (Examination Scheme)

पाठ्यक्रमको रुपरेखाः यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छः

प्रथम चरणः लिखित परीक्षा पूर्णाङ्कः १००

द्वितिय चरणः अन्तर्वार्ता पूर्णाङ्कः २०

प्रथम चरणः लिखित परीक्षा योजना (Examination Scheme)

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

द्वितिय चरणः

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	२०	मौखिक

द्रष्टव्यः

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

२. लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

Part	I Civil Engineering			II Highway Engineering				III Laboratory Testing					
पाठ्यक्रमका एकाइ	१	२	३	४	५	६	७	८	९	१०	११	१२	१३
प्रश्न संख्या	३	४	५	३	२	४	६	३	३	५	४	४	४

३. वस्तुगत बहुवैकल्पिक प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

४. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

५. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ।

६. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

७. पाठ्यक्रम लागू मितिः २०७७/९/१२

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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, बागमती

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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

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

---The End---