

**Technical Subject (Civil Engineering - Highway)**

**Section (A)**

**1. Transport/ Highway Planning**

- 1.1 Historical development of transport network in Nepal
- 1.2 Intermodal transport system approaches (motorized and non-motorized modes)
- 1.3 Highway planning process
- 1.4 Travel characteristics and data: Land-use and transport models (integrated approach for transport planning)
- 1.5 Highway project development cycle: Prefeasibility / Feasibility study, Detail studies and implementation
- 1.6 Transport cost and economic analysis
- 1.7 Highway funding and financing: alternate highway financing models
- 1.8 Highway Management Information System (HMIS), Intelligent Transport System (ITS)
- 1.9 Global, regional and national policies related to road transport development and management
- 1.10 Adopting climate change impacts in road infrastructure development
- 1.11 Social and environmental consequences of highways and their mitigation measures

**Section (B)**

**2. Geometric Design**

- 2.1 Design standards: Nepal Road Standards, Nepal Rural Roads Standards, Urban Road Standards
- 2.2 Highway/road classifications: Hierarchy of road networks
- 2.3 Road alignment survey and selection criteria
- 2.4 Geometric design control and criteria
- 2.5 Vertical and horizontal alignment, cross-sections
- 2.6 Hill roads design and issues
- 2.7 Design of cut and embankment slopes for stability
- 2.8 Geometric design of urban roads
- 2.9 Design of road side facilities

**Section (C)**

**3. Traffic Engineering and Road Safety**

- 3.1 Traffic studies: volume, speed, axle load, origin and destination, parking, accidents and other
- 3.2 Highway capacity and level of services

- 3.3 Design and implementation of traffic control devices: road signs, marking, signals
- 3.4 Intersection design: design criteria, roundabout, priority junctions, channelization, signalized junction
- 3.5 Urban traffic management schemes: one-way streets, right turn restrictions, speed control and traffic calming measures, warrants for the intersection improvement, types and design criteria for grade separated interchanges
- 3.6 Road safety status in Nepal: National and global initiatives for road safety
- 3.7 Road safety audit: principles, road safety issues and safety recommendations
- 3.8 Principles of safer road design: alignment, cross-sections, access control and management, safety measures for vulnerable road users
- 3.9 Traffic congestion management, Importance of public transit

### **Section (D)**

#### **4. Highway Materials and Pavement Design**

- 4.1 Properties of highway materials: soil, aggregates and bitumen
- 4.2 Highway material testing, quality control and specifications
- 4.3 Activities in the road construction: Earthwork and pavement works
- 4.4 Road construction machines, equipment and plants: functions and optimization
- 4.5 Construction procedure of flexible and rigid pavement layers including sub-grade
- 4.6 Specifications and quality control aspects of pavement layers (sub-grade, sub base, base, pavement, concrete etc.)
- 4.7 Flexible pavements: design criteria, traffic considerations, sub-grade evaluation
- 4.8 Rigid pavement: types, design criteria and procedure, traffic considerations, temperature differential, critical stress conditions, cumulative fatigue damage analysis, design of dowel and tie bars
- 4.9 Pavement distress types: flexible and rigid pavements
- 4.10 Design of pavement for low volume roads: flexible and rigid
- 4.11 Pavement moisture control design of drainage layers
- 4.12 Design of overlays

### **Section (E)**

#### **5. Highway Drainage System**

- 5.1 Classification of highway drainage structures
- 5.2 Design of side drains
- 5.3 Design criteria of drainage systems in hill roads: catch water drains, road rapids, intercepting drains, energy dissipating structures
- 5.4 Types of Bridges, bridge site selection and sub soil exploration
- 5.5 Design calculations: flood discharge, linear waterway, afflux, scour depth, depth of foundation, length of clear span and number of spans
- 5.6 Structural analysis and design of bridges
- 5.7 Design of bridge foundation, sub structure and superstructure
- 5.8 River training works: design and construction

लोक सेवा आयोग  
नेपाल इन्जिनियरिङ्ग सेवा, सिभिल समूह, हाईवे उपसमूह, रा.प.द्वितीय श्रेणी, खुला र आन्तरिक प्रतियोगितात्मक  
परीक्षाको पाठ्यक्रम

- 5.9 Bridge foundation and its types, construction methods and testing
- 5.10 Maintenance of bridges
- 5.11 Design concepts of culvert and causeway

**6. Highway Tunnel and Asset management**

- 6.1 Design standards for road tunnel: types, general features
- 6.2 Drainage, lighting and ventilation requirement in road tunnel
- 6.3 Construction technology in road tunnels
- 6.4 Maintenance of road tunnels
- 6.5 Operational and management issues of short and long road tunnel
- 6.6 Level of service and performance indicators of highways
- 6.7 Road asset management, concepts/practices and challenges, pavement deterioration models
- 6.9 Types of highway maintenance, Maintenance strategy, Maintenance planning / funding, Performance based maintenance practices
- 6.8 Flexible and rigid pavement conditions assessment and maintenance methods
- 6.9 Principles of pavement management system

**Section (F)**

**7. Service/Group/Sub-group related- Specific (Acts, Rules and Policies)**

- 7.1 सवारी तथा यातायात व्यवस्था ऐन, २०४९
- 7.2 सार्वजनिक सडक ऐन, २०३१
- 7.3 सडक बोर्ड ऐन, २०५९
- 7.4 मध्यस्थता ऐन, २०५५
- 7.5 Nepal Road Standard, 2077
- 7.6 Nepal Feeder Roads Standard, 1997
- 7.7 Standard Specifications for Road and Bridge works, 2058
- 7.8 20 Years Road Plan (2003-2022)
- 7.9 National Transport Policy
- 7.10 The Department of Roads Strategy, 1997

**नोट :** यस पत्रमा माथि उल्लिखित पाठ्यक्रमको खण्ड (F) बाहेकका प्रत्येक खण्ड (Section) बाट कम्तीमा **एक प्रश्न** समावेश हुने गरी लिखित परीक्षामा देहाय बमोजिमको संख्या र अङ्कभारका प्रश्नहरू सोधिने छ। तर खण्ड (F) बाट ५ अङ्कभारको छोटो उत्तर आउने एक प्रश्न र १० अङ्कभारको लामो उत्तर आउने एक प्रश्न गरी **दुई प्रश्नहरू** सोधिने छ।

पत्र	विषय	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या × अङ्क	समय
द्वितीय	Technical Subject	१००	४०	विषयगत (Subjective)	1 × 5 & 1 × 10 = 15 (Short & Long Answers) 3 × 15 = 45 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	३ घण्टा

पाठ्यक्रम लागू मिति :- २०८१/०३/३० देखि