नेपाल नागरिक उड्डयन प्राधिकरण
प्राबिधिक सेवा, सिभिल इन्जिनियरिङ्ग समूह, दशौं तह, उपनिर्देशक पदको खुला/आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्रः– सेवा सम्बन्धी
खण्ड (क) - ६० अङ्क

1. **Civil Aviation: History and developments**
   - 1.1 History of Civil Aviation and role of International Civil Aviation Organization ICAO)
   - 1.2 History of Civil Aviation in Nepal
   - 1.3 Function and responsibility of Civil Aviation Authority of Nepal
   - 1.4 International and Domestic Airports in Nepal
   - 1.5 Air Services Agreements of Nepal
   - 1.6 The economic, political, and social roles of airports
   - 1.7 Impact of Liberal Aviation policy in Nepal
   - 1.8 Privatization of Airports in Nepal

2. **Airport Planning and Design**
   - 2.1 **Elements of Airport Planning**
     Information required for planning consideration, preliminary feasibility of physical requirements

3. **Airport Master Planning and Design**
   - 3.1. **The Elements of Airport Master Planning**
     - 3.1.1. Information required for planning consideration
     - 3.1.2. Air Space planning
     - 3.1.3. Preliminary feasibility of physical requirements
     - 3.1.4. Aircraft characteristic related to airport design
     - 3.1.5. Wind rose diagram
     - 3.1.6. Runway orientation and runway configurations
     - 3.1.7. Airport site evaluation and selection
     - 3.1.8. Use of GIS in Airport system planning
     - 3.1.9. Aeronautical study
     - 3.1.10. Operational considerations for airport site selection
     - 3.1.11. Components of the airport system for an airport
     - 3.1.12. Airport system plan, airport master plan and airport project plan
     - 3.1.13. Socio-economic and financial feasibility
     - 3.1.14. Airport land-use planning, environmental impact assessment
   - 3.2. **Traffic forecasting for planning purpose: (Passenger, Aircraft, Cargo, Mail)**
     - 3.2.1. Principle and methods of air traffic demand forecasting
     - 3.2.2. Factors affecting air traffic growth
     - 3.2.3. Accuracy and limitations of forecasting
     - 3.2.4. Forecasting requirements and applications
   - 3.3. **Aerodrome Design**
     - 3.3.1. Geometric Design of the Aerodrome
     - 3.3.2. Runway, Taxiway, Apron and Holding Bays
     - 3.3.3. Control Tower and Visibility Requirements

4. **Airport Airside Capacity and Delay**
   - 4.1. Capacity and delay
   - 4.2. Practical and Ultimate Capacity, maximum throughput rate
   - 4.3. Factors affecting capacity and delay
   - 4.4. Runway capacity, Apron Gate Capacity, Taxiway Capacity

4.5. Estimating Capacity and delay
4.6. Approaches to reducing delay

5. **Airport Terminal and Ground Access**
   5.1. **Passenger Terminal System**
      5.1.1. Access Interface
      5.1.2. Passenger Processing
      5.1.3. Flight Interface
   5.2. **Design Considerations**
      5.2.1. Terminal Planning Process
      5.2.2. Apron-Gate System
      5.2.3. Baggage Handling System
      5.2.4. Passenger amenities
      5.2.5. Airport ground Access
      5.2.6. Fire access roads and layouts
      5.2.7. Internal Airport Roadway Circulation
      5.2.8. Passenger Building Curb
      5.2.9. Land side Vehicle Parking
      5.2.10. Road Signage and Markings

6. **Airport Pavement**
   6.1 **Types of Airport Pavements (Rigid & Flexible Pavements)**
      6.1.1 Design factors for structural design of pavements: Traffic and loading, Environment, Materials, Failure criteria etc.
      6.1.2 CBR Method for design of Flexible Airport Pavements
      6.1.3 Design of Rigid Pavements
      6.1.4 Pavements Design Using Elastic Layer Theory
      6.1.5 FAA Method of Design for Flexible and Rigid Airport Pavement
      6.1.6 FAA pavement design software (FAARFIELD software), understanding of cumulative damage factor (CDF) concept
   6.2 **Design of Overlay Pavements**
      6.2.1 Flexible pavement overlays on flexible pavements,
      6.2.2 Flexible pavement overlays on rigid pavements
      6.2.3 Rigid pavement overlays on flexible pavements
      6.2.4 Rigid pavement overlay on rigid pavements

7. **Airport Drainage**
   7.1. **Basic concept of airport drainage, catchment area, surface runoff, layout of surface drainage, subsurface drainage**
      7.1.1 Intensity - duration pattern for the Design Storm
      7.1.2 Amount of runoff using FAA, Corps of Engineers guidelines
      7.1.3 Layout of Surface drainage
      7.1.4 Sub surface drainage
   7.2. **Pavement Management Systems**
      7.1.5 Aircraft Classification Number (CAN) and Pavement Classification Number (PCN) as per ICAO
      7.1.6 Pavement condition index
      7.1.7 Pavement surface friction and tests,

7.1.8 Pavement evaluation and methods of conducting the test to verify the structural strength of the pavement
7.1.9 Airport Pavement Preservations

7.3. **Innovative Technologies**
7.3.1 Superpave for Airport Pavement
7.3.2 Warm mix Asphalt for Airports
7.3.3 Fuel Resistant Asphalt Mixes
7.3.4 Polymer modified stone mastic asphalt Pavement

7.4. **Visual Aids for Navigation**
7.4.1 Indicators and Signaling Devices
7.4.2 Markings
7.4.3 Signs
7.4.4 Lights in general
7.4.5 Markers

8. **STOLport and Heliports**
8.1. STOLport: Characteristics of STOLport and its importance in Nepal
8.2. Helipad: Characteristics of helipad and its importance in Nepal
8.3. Heliports: Characteristics of helicopters for heliport design, factors affecting the site selection of heliport

खण्ड (ख) - ४० अङ्क

9. **Aerodrome Construction Management**
9.1 Construction of Infrastructures
9.2 Construction Materials
9.3 Construction Equipment
9.4 Construction Managements
9.5 PPMO and FIDIC Guidelines
9.6 Monitoring and Quality Assurance in Airport Construction
9.7 Work Schedule, CPM, PERT method of scheduling the construction activities, Preparation of progress reports, Earned Value Analysis (S-curve), use of scheduling software.
9.8 Variation, alteration and omissions
9.9 Dispute, Claim, Adjudication, Arbitration
9.10 Construction Quality Control
9.11 Owner Acceptance Testing
9.12 Takeover of the project

10. **Maintenance Planning**
10.1 Periodic Plan
10.2 Routine Plan
10.3 Recurrent Plan
10.4 Emergency Plan
10.5 Replacement Plan

11. **Aerodrome Safety and Management**
11.1 **Aerodrome Safety**
11.1.1 ICAO Universal Safety Oversight Audit Program (USOAP)

11.1.2 Regulatory functions and requirements under Civil Aviation Authority of Nepal
11.1.3 ICAO and National requirements on certification of aerodrome
11.1.4 Aerodrome Certification procedure in Nepal
11.1.5 Surveillance, audit and inspection of aerodromes for the certification

11.2 **Safety Management**
11.2.1 Concept of State Safety Program (SSP)
11.2.2 Safety Management System (SMS)
11.2.3 Safety policy, Safety risk management, Safety assurance & Safety promotion
11.2.4 Hazard identification, Safety Risk Assessment, Risk mitigation, gap-analysis, Acceptable Level of Safety, SMS implementation, Runway Safety Program, Runway Safety Team, Safety Action Group, Safety Review Board, Current status of SMS implementation
11.2.5 Wildlife Hazard Management (WHM)

12. **Aviation Security**
12.1 Basic concept
12.2 National Civil Aviation Security Programs
12.3 Restricted areas and access control
12.4 Airside vehicle control
12.5 Perimeter control for the operational areas
12.6 Isolated Aircraft parking position

13. **Facilitation in Airport Operation**
13.1 National Airport Facilitation Program
13.2 Facility Required for public health emergency and medical relief
13.3 Transfer and Transit facilities
13.4 Baggage handling facilities
13.5 Cargo handling and Clearing facilities
13.6 Search and rescue facilities
13.7 Facilities required to Respond natural and manmade disaster
13.8 Facilities for the transport of person with disabilities

14. **Airport Economics and Management**
14.1 National economy and airport sector development strategy
14.2 Airport financing and investment modalities
14.3 Concept of infrastructure development and operation through Public Private Partnership (PPP), Build, Operate & Transfer (BOT), Build, Own, Operate & Transfer (BOOT), Engineering Procurement Construction/Financing (EPC/EPCF)
14.4 Concept of project financial analysis Such as ROI (Return on Investment), IRR (Internal Rate of Return), NPV (Net Present Value) and others
14.5 Resources Mobilization for aerodrome development
14.6 Concept of Airport Management Information System

15. **Environmental Impacts of Airports and Aviation Activities**
15.1 Aircraft noise in the vicinity of airports
15.2 Water, Air and soil pollution in the vicinity of airport
15.3 Initial environmental examination (IEE)

15.4 Environmental impact assessment (EIA)
15.5 Environmental management plan during construction and operation phases of airport
15.6 Global environmental issues arising from aviation activities
15.7 Sustainable Development Goals (SDG) in aviation

द्वितीय पत्रबाट निम्नानुसार प्रश्न सोधिनेछ :

द्वितीय पत्र					
विषय	**खण्ड**	**अङ्कभार**	**परीक्षा प्रणाली**		**प्रश्न संख्या x अङ्क**
सेवा सम्वन्धी	**(क)**	६०	विषयगत	समस्या समाधानमूलक प्रश्न	३ प्रश्न x २० अङ्क
	(ख)	४०		सैद्धान्तिक-तर्कयुक्त र विश्लेषणात्मक प्रश्न	१ प्रश्न x १५ अङ्क
				व्यावसायिक योजना/मामिला विश्लेषण सम्बन्धी प्रश्न	१ प्रश्न x २५ अङ्क
	जम्मा	**१००**			