Nepal Airlines Corporation
Syllabus for Senior IT Engineer, Grade- VIII
General Technical Service
Internal Competition

Stages and Procedure of Examination System

First Stage: Written Examination - Full Marks 200

Weightage Allocation and Marks Distribution

S.No.	Paper	Subject	Time	Full Mark	Section	Marks
1	I	Institutional Awareness and Management	3 Hrs.	100	Section "A" Institutional Awareness	Long Answer 5x10=50
					Section "B" Management	Long Answer 5x10=50
2	II	Service Related	45 Min.	100	Multiple Choice Questions	50x2=100

Second Stage - Interview

Individual Interview — Full Marks - 30

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी वा दुबै हुनेछ ।
२. प्रथम, द्वितीय र तृतीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
३. लिखित परीक्षामा यथासम्भव पाठ्यक्रमका सबै एकाइबाट प्रश्नहरु सोधिनेछ ।
४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
५. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तर पुस्तिकाहरु हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तर पुस्तिकामा लेख्नुपर्नेछ ।
६. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
७. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
८. यस भन्दा अगाडि लागू भएका माथि उल्लिखित सेवा/समूहको पाठ्यक्रम खारेज गरिएको छ ।
९. पाठ्यक्रम लागू मिति :– २०७९।०५।०४

Paper I

Subject: Institutional Awareness and Management

Full Marks: 100

Time: 3hrs.

खण्ड (क) :- संस्थागत ज्ञान (५० अङ्क)

१. संस्थागत ज्ञान (३x१०=३० अङ्क)

१.१ नेपाल वायुसेवा निगमको स्थापनाको उद्देश्य, संगठनात्मक संरचना, कार्यक्षेत्र, SWOT Analysis, समस्या र चुनौती
१.२ नेपाल वायुसेवा निगमको पुनर्संरचनाको आवश्यकता र औचित्य
१.३ नेपाल वायुसेवा निगमबाट प्रवाह हुने सेवाको गुणस्तर, गुणस्तर नियन्त्रण तथा सेवाग्राहीको सन्तुष्टि तथा सेवाको मूल्य निर्धारण सम्बन्धी व्यवस्था
१.४ अन्य वायुसेवाहरु सँगको प्रतिस्पर्धा, चुनौती तथा भावी कार्यदिशा
१.५ अन्तर्राष्ट्रिय नागरिक उड्डयन संगठनको स्थापना, लक्ष्य तथा उद्देश्य
१.६ नेपाल नागरिक उड्डयन प्राधिकरणको स्थापना, लक्ष्य, उद्देशय, कार्यहरु र नियमनकारी भूमिका
१.७ नेपालमा सार्वजनिक संस्थानको आवश्यकता, उद्देश्य, स्वायत्तता, उत्तरदायित्व, समस्या र चुनौती
१.८ संस्थागत सुशासनको अवधारणा र नेपाल वायुसेवा निगमको संस्थागत सुशासनको अवस्था
१.९ आवधिक योजनामा हवाई क्षेत्र
१.१० नेपाल वायुसेवा निगमको नेपाल सरकार तथा सम्वद्ध निकायहरुसँगको सम्बन्ध र समन्वय

२. संविधान र सम्वद्ध कानूनहरु (२x१०=२० अङ्क)

२.१ नेपालको वर्तमान संविधान
२.२ नेपाल वायुसेवा निगम ऐन, २०१९
२.३ नेपाल वायुसेवा निगमका कर्मचारीहरुको सेवा, शर्त सम्बन्धी विनियमावली र आर्थिक विनियमावली
२.४ भ्रष्टाचार निवारण ऐन, २०५९
२.५ आवश्यक सेवा सञ्चालन ऐन, २०१४
२.६ सुशासन (व्यवस्थापन तथा सञ्चालन) ऐन, २०६४ र सुशासन (व्यवस्थापन तथा सञ्चालन) नियमावली, २०६५
२.७ सूचनाको हक सम्बन्धी ऐन, २०६४
२.८ सार्वजनिक खरिद ऐन, २०६३

खण्ड (ख) :- व्यवस्थापन (५० अङ्क)

3. General Management 3x10=30 Marks

3.1 Modern Approaches to Management
3.2 Motivation, Leadership, Control, Coordination and Team Work
3.3 Role of Manager and Managerial Functions
3.4 Managerial Decision Making and Problem Solving
3.5 Managing Workforce Diversity

3.6 Succession Planning
3.7 Quality Management and TQM Techniques
3.8 Corporate Planning, Strategic Management and Corporate Social Responsibility
3.9 Forces of Organizational Change
3.10 Resistance to Change and Overcoming the Resistance to Change
3.11 Concept and Characteristics of Organizational Development
3.12 Stress Management
3.13 Crisis Management

4. Management Information System (MIS) 1x10=10 Marks

4.1 Information and Decision Making
4.2 Role and Importance of MIS
4.3 Managers and Environment
4.4 Management as a Control System
4.5 System View of Business
4.6 Impact of Information System in the Organization and the Society
4.7 MIS as a Tool for Management Process
4.8 Basic Knowledge of IT
4.9 Role of IT in Employee and Organizational Performance
4.10 Use of IT in HRM and Accounting System of Nepal Airlines Corporation
4.11 ERP (Enterprise Resource Planning)

5. Project Management and Project Evaluation 1x10=10 Marks

5.1 Project Concept, Objectives, Project Implementation Schedule, Project Implementation Alternative Solutions and Project Leadership
5.2 Preparation of Cost Estimate and Budget, Variation in Project Cost, Opportunity Cost Concept, Incremental Cost and Revenue Analysis, Cost Benefit Analysis, Present Value of Project Cost, Internal Rate or Return, Average Rate of Return and Investment, Network, Cost of Capital

Paper II
Service Related

Full Mark: 100 (Multiple Choice Questions 50x2)
Time: 45 minutes

Section A- 50 Marks

1. Data Structure and Algorithms 5x2=10 Marks

1.1 Fundamental of data structures, abstract data types
1.2 Lists, linked lists, stacks
1.3 Queues, priority queue
1.4 Trees: Traversal, Implementations, Binary Trees, Binary Search Trees, Blanched search trees, AVL Trees
1.5 Indexing methods: Hashing trees, suffix trees
1.6 Worst-case and expected time complexity
1.7 Analysis of simple recursive and recursive algorithms
1.8 Searching, Merging and Sorting
1.9 Introductory Notions of algorithm design: Divide and conquer, dynamic programming, minimum spanning trees, directed acyclic graphs

2. Programming Language 5x2=10 Marks

2.1 Overview of Programming language: history, programming paradigms, the role of language translated in the programming process
2.2 Fundamental issues in language design
2.3 Virtual Machines, code generation, loop optimization
2.4 Concept of procedural programming, structural programming, object-oriented programming
2.5 Concept of C programming, C++ programming
2.6 Java programming for declaration, modularity and storage management software development.

3. System Analysis and Design 10x2=20 Marks

3.1 Definition of the system, system owner, system user, system designers and system builders, system analysts, variations on the system analyst title, system life cycle
3.2 Joint application development (JAD): JAD definition, JAD purpose, JAD Philosophy, JAD Scope
3.3 Involved in a JAD Group Member: Project Leader, Record Keeper, and Time Keeper
3.4 Roles of JAD Group Member: Project Leader, Record Keeper, Time Keeper
3.5 System Design Environment: Development process, management process, system structure, basic component of computer based information system, personal/centralized/distribution system
3.6 Concept formations: Introduction, finding the problem, evaluating the proposal, technical feasibility, operational feasibility, economic feasibility

3.7 Requirements analysis: Representing system analysis model, requirement model, design model
3.8 Development process: Design method
3.9 Entity relationship diagram (E-R Diagram): Notations, Entities: Strong entities, weak entities, attributes: Simple and Composite, Single Valued and Multiple Valued, Null and Derived attribute
3.10 Relationship sets: Degree of relationship and cardinality relationship, specialization, generalization, aggregation
3.11 Data flow diagrams (DFDs): Introduction, data flow diagram, symbol, files or data store, external entities, data flows
3.12 Describing system by data flow diagram: Context diagram, top level DFD, Expansion Level DFD, Conversions of data
3.13 Object modeling: Object-oriented concept, object structure, object feature, class and object
3.14 Representation: Association, composition, inheritance, multiple inheritances
3.15 Modeling: Use case diagram, state diagram, event flow diagram
3.16 Documentation: Automatic and manual system

4. Operating System 5x2=10 Marks

4.1 Definition, development and function of operating systems
4.2 Basic components of the operating systems, information storage and management systems
4.3 Disk allocation and scheduling methods, basic memory management strategies, virtual memory management techniques, define a process and features of the process management systems
4.4 Features of process scheduling; List the features of inter-process communication and deadlocks
4.5 Concepts of parallel and distributed processing, identify security threats to operating systems
4.6 overview of the MS-DOS operating system
4.7 Introduction to the Windows family of products, UNIX family of products, Linux family of products
4.8 Introduction to Windows Networking
4.9 Windows Architecture, Linux Architecture
4.10 Troubleshooting windows and Linux
4.11 Managing network printing
4.12 Managing hard disks and partitions
4.13 Monitoring and troubleshooting windows
4.14 Users, groups and permission Linux and Windows

Section-B - 50 Marks

5. Database Management System and Design 5x2=10 Marks

5.1 Introduction, a database model, relational database model, integrity, RBDMS,
5.2 SQL and Embedded SQL
5.3 Writing basic SQL SELECT statements
5.4 Restricting and sorting data

5.5 Single row functions
5.6 Displaying data from multiple tables
5.7 Aggregation data using group functions
5.8 Sub-queries, manipulating data and creating and managing tables
5.9 Creating views and controlling user access
5.10 Using set operators, date time function
5.11 Database design: Logical Design, Conceptual Design, Mapping Conceptual to Logical, Pragmatic issues, physical design, integrity and correctness, relational algebra, relational calculus
5.12 Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, DKNF
5.13 Architecture of DBMS: Client-server, open architectures, transaction processing. multi-user and concurrency and backup and recovery database
5.14 Basic concept of major RDBMS products: oracle, Sybase, DB2, SQL server and other databases

6. Networking **5x2=10 Marks**

6.1 Basic network theory: network definition, network modules, connectivity, network addressing
6.2 Network connectivity: Data package, establishing a connection, reliable delivery, network connectivity, noise control, building codes, connection devices
6.3 Advanced network theory: OSI Mode, Ethernet, network resources, token ring, FDDI, wireless networking
6.4 Common networking protocols: Families of protocols, NetBEUI, bridge and switches, TCP/IP protocol, building TCP/IP network, TCP/IP Suite
6.5 TCP/IP Services: Dynamic host configuration protocol, DNS name resolution, NetBIOS support, SNMP, TCP/IP Utilities, FTP
6.6 Network LAN Infrastructure: LAN protocols, data movement in a routed network, virtual LAND (VLANS)
6.7 Network WAN Infrastructure: WAN Environment, WAN transmission technologies, WAN connectivity devices, Voice over data
6.8 Remote Networking: Remote Networking, Remote access protocols, VPN technologies
6.9 Computer Security: Computer virus, worm, Trojan Horse
6.10 Network Security: Introduction, virus protection, local security, network access, internet security

7. E-Commerce Technology **5x2=10 Marks**

7.1 Introduction to E- Commerce
7.2 Electronic commerce strategies
7.3 Ele3ctronic commerce security issue
7.4 Success models of E-Governance
7.5 E- business, b2b, b2c, b2e, c2c, g2g, g2c
7.6 Principles of electronic payment strategies and systems
7.7 E- marketing, Reverse engineering
7.8 E-Banking, EDI Methods, SWIFT
7.9 Encryption and Decryption methods, XML, layout managers, event model

8. MIS and Web-engineering **5x2=10 Marks**

8.1 Information systems silence server computing
8.2 Information systems and decision making
8.3 Database design issues, data mining, data warehousing
8.4 Knowledge management, the strategic use of information technology
8.5 Work process redesign, reengineering with information technology, Enterprise Resources Planning Systems, Information system security, information privacy and global information technology issues
8.6 Software supported demonstration including advanced spreadsheet topic software components based system (CBSE)
8.7 Multimedia
8.8 Object orient programming with COMS and DECOMS
8.9 Group decision support systems
8.10 Basic of web-site design

9. IT in Nepal **5x2=10 Marks**

9.1 History of IT in Nepal
9.2 It policy of Nepal
9.3 Electronic Transaction Act
9.4 Copyright Act
9.5 Uses of computers and software developer