Nepal Airlines Corporation

Syllabus of Computer Software Engineer (Grade– VII)

Open Competition

A. Stages and Procedure of Examination System

चरण	विषय	अंकभार	परीक्षा प्रणाली	प्रश्न संख्या x अङ्क	समय
प्रथम चरण ८०%	लेखन शिप सेवा सम्बन्धी	पुर्णांक १०० उत्तिर्णांक ४०	**Multiple Choice Questions** (वस्तुगत) विषयगत प्रश्नोत्तर	७० x १ = ७० ०६ x ५ = ३०	३ घण्टा
द्वितिय २०%	अन्तरवार्ता	२०	मौखिक		

B. Content Material

1. Structured and Object oriented Programming

Data types, ADT
Operators, variables and assignments, control structures Procedure/Function
Class definitions, encapsulation, inheritance, object composition, polymorphism
Greedy methods, priority queue search, Exhaustive search, divide and conquer, dynamic programming, recursion
Hashing
Graphs and digraphs sorting

(5 objective questions each of 1 mark and 1 subjective question of 5 marks)

2. Computer Architecture and organization

RISC/CISC architecture
Instruction format, arithmetic and logical instruction addressing modes
Hardwired and micro-programmed control
I/O programming, memory mapped I/O, basic interrupt system, DMA

(5 objective questions each of 1 mark)

3. Software Engineering & Software Project Management

Software process
Software project management
Software requirements
Software design
Software quality, Software reliability and quality assurance
Verification and Validation techniques
Critical System Validation
Implementation and testing
Embedded Software
Project management
Project planning

Quality management
Configuration management
Process improvement

(10 objective questions each of 1 mark and 2 subjective question of 5 marks)

4. Database management system

Relation model, ER model, SQL, functional dependency and relational database design, file structure
Concurrent execution of the user programs, transactions, concurrent control techniques
Crash recovery: types of failure, recovery techniques
Query processing and optimization
Hash based indexing, tree based indexing
Distributed database systems and object oriented database system
Security management system

(10 objective questions each of 1 mark and 1 subjective question of 5 marks)

5. Operating system

Symmetric multiprocessing, micro-kernels, concurrency, mutual exclusion and synchronization, deadlock
Scheduling
Deadlocks
Memory management
File system
Distributed message passing, RPC, client/server computing, clusters

(5 objective questions each of 1 mark)

6. Management Information System

6.1. Organization and Information System

Changing Environment and its impact on Business- The IT/IS and its influence-The Organization: Structure, Managers and activities- Data, information and its attributes- The level of people and their information needs- Types of Decision and information- Information System, categorization of information on the basis of nature and characteristics.

6.2. Kinds of Information Systems

Transaction Processing System (TPS)- Office Automation System (OAS)-Management Information System (MIS) – Decision Support System (DSS) and Group Decision Support System (GDSS) – Expert System (ES) – Executive Support System (EIS or ESS).

6.3. Enterprise System

Enterprise Resources Planning (EPR): Features, Selection criteria, merits, issues

and challenges in implementation- Supply Chain Management (SCM): Customer Relationship Management (CRM): Phases, Knowledge Management. Enterprise service oriented architecture (SOA) cloud computing for Enterprise architecture Enterprise SOA data center.

(5 objective questions each of 1 mark and 1 subjective question of 5 marks)

7. Information Security

Security Policies
Cryptography
Access control & Information flow
Auditing
Intrusion Detection System

(5 objective questions each of 1 mark)

8. Artificial Intelligence

Search

Natural Language Processing Game
Planning
Learning

Automated Reasoning Planning
Vision and Robotics

(5 objective questions each of 1 mark)

9. Theory of Computation

BNF, Languages, Grammars

DFA and NDFA, regular expressions, regular grammars Closure, homomorphism
pigeonhole principle, pumping lemma

CFGs, Parsing and ambiguity, Pushdown automata, NPDAs & CFGs Pumping lemma
Turing Machines

Recursively enumerable languages unrestricted grammars

The Chomsky hierarchy, Undecidable problems, Church's Thesis Complexity Theory, P and NP

(5 objective questions each of 1 mark)

10. Compiler Design

The Structure of a computer Lexical
Analyzer

Top down Parsing/ Bottom up Parsing Syntax
Directed Translation
Types and Type Checking

Run-Time Storage Administration Intermediate
Code Generation
Data-Flow Analysis and Code Optimizations
Architecture and recent development on compliers

(5 objective questions each of 1 mark and 1 subjective question of 5 marks)

11. Computer Graphics

Graphics Concepts

Input devices and techniques

Basic raster graphics algorithms and primitives Scan
Conversion
Graphics hardware

2D geometrical transformations and viewing 3D geometry
and viewing

Hierarchical modeling
Projections
Hidden surface removal Shading and rendering
(5 objective questions each of 1 mark)

12. IT in Nepal

History of IT Development IT Policy of 2010 A.D
Electronic Transaction Act 2063 B.S Copy Write Act, 2022 B.S
Uses of Computers and Software Development Nepali Unicode, Nepali Fonts
Licensing
(5 objective questions each of 1 mark)

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