कम्प्युटर अधिकृत (राजपत्रांकित तृतीय श्रेणी) — द्वितीय पत्र

Computer Officer (Gazetted Third Class) — Second Paper

विषय: Technical Subject

पूर्णाङ्क	उत्तीर्णाङ्क	समय	प्रश्न संख्या
100	40	3 घण्टा	10
10 questions × 10 marks			

यो प्रश्नपत्र लोक सेवा आयोगको 2083 सालको परीक्षा ढाँचा (पूर्णाङ्क, समय, प्रश्न संख्या र खण्ड विभाजन) मा आधारित रहेर **Loksewa Pathsala** ले तयार पारेको मौलिक अभ्यास (मोडल) प्रश्नपत्र हो। यो आयोगको आधिकारिक प्रश्नपत्र होइन। This is an original practice paper prepared by Loksewa Pathsala on the 2083 exam pattern; it is not an official Lok Sewa Aayog question paper.

Instructions:

1. Answer all questions. Marks are shown against each question.
2. Answers may be written in Nepali, English or both.
3. Write Section A and Section B in separate answer books where instructed.

Section A: Computer Architecture, Data Structures and Programming — 30 marks

1. Explain pipelining in a processor. What are pipeline hazards and how are they handled? **10**

2. Compare arrays and linked lists. Write an algorithm to insert a node at the beginning of a singly linked list. **10**

3. Explain the principles of object-oriented programming with suitable examples. **10**

Section B: Software Engineering and Database — 20 marks

4. Compare the waterfall and agile models of software development. Which is more suitable for government IT projects and why? **10**

5. What is normalization? Explain 1NF, 2NF and 3NF with examples. **10**

Section C: Operating System and Networking — 20 marks

6. Explain deadlock. Describe the necessary conditions and methods for handling deadlock. **10**

7. Explain subnetting with an example. Divide 192.168.10.0/24 into four equal subnets. **10**

Section D: Information Security, E-governance and IT Policy — 30 marks

8. Explain symmetric and asymmetric encryption. How do digital signatures ensure authenticity? **10**

9. Discuss the role of a government integrated data centre and cloud services in e-governance in Nepal. **10**

10. What measures should a government office adopt to protect its information systems from cyber attacks? **10**

— Best of luck —

Loksewa Pathsala

Answer pointers (for self-check)

These pointers show what a good answer should cover; write your own full answer.

1. Instruction stages; structural, data and control hazards; forwarding, stalls, branch prediction.

2. Contiguous vs dynamic memory, access time, insertion cost; create node, link to head, update head.

3. Encapsulation, inheritance, polymorphism, abstraction.

4. Sequential vs iterative; changing requirements, user feedback; hybrid approach.

5. Reduce redundancy; atomic values, no partial dependency, no transitive dependency.

6. Mutual exclusion, hold and wait, no preemption, circular wait; prevention, avoidance (Banker's algorithm), detection and recovery.

7. Borrow 2 bits → /26; 192.168.10.0, .64, .128, .192, each with 62 usable hosts.

8. Single shared key vs key pair; hash signed with private key, verified with public key; PKI.

9. Hosting, availability, cost saving, security; data sovereignty, backup, capacity.

10. Policy, access control, patching, backups, monitoring, incident response, training, audits.

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