लोक सेवा आयोग

नेपाल विविध सेवा, राजपत्राङ्कित तृतीय श्रेणी (प्राविधिक) कम्प्युटर इञ्जिनियर पदको प्रतियोगितात्मक लिखित परीक्षा

मिति: २०८३/१/८

समय: ३ घण्टा पूर्णाङ्क: १००

पत्र: द्वितीय

विषय: Technical Subject

तलका प्रश्नहरूको उत्तर Section अनुसार छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

Section – A 25 Marks

1. Explain in detail about memory reference instructions. Differentiate between hardwired control unit and microprogrammed control unit. 3+2=5
2. Explain the block diagram of an analog communication system and describe each of its components. Discuss the concept of error detection and correction in digital communication. 5+5=10
3. State the major difference between distance vector routing and link state routing. Explain in detail congestion control algorithms. 5+5=10

Section – B 25 Marks

4. Differentiate between structured oriented and object oriented programming with examples. 5
5. Explain software lifecycle models and risk-driven approaches. Discuss software project management including major components such as project planning, project control, project organization and quality assurance. Also, list out some popular ISO standards. 4+4+2=10
6. What is scheduling in an operating system? Describe Round Robin scheduling algorithms. Differentiate between Network operating system and Distributed operating system. 1+5+4=10

Section – C 20 Marks

7. Explain how scanline algorithm can be used for hidden surface removal? 10
8. Explain the importance of cross-compilers. How they are different from regular compilers and what challenges are related with their development? Additionally, how does the inclusion of polymorphism and dynamic typing influence in the compiler design? 10

Section – D 30 Marks

9. Write a technical proposal for developing a Smart Traffic Management System using Artificial Intelligence and IoT. Your proposal should include:

   a. Problem Statement
   b. Objectives
   c. Proposed Solution (Architecture, Technologies Used)
   d. Expected Benefits
   e. Challenges and Possible Solutions

   Your response should emphasize logical reasoning, feasibility and innovative ideas rather than just stating facts. 10

10. Consider a case below: 10+10=20

a) Identify relevant attributes and construct an ER diagram with proper mapping constraints for a university which has many departments and each department has multiple instructors; one among them is the head of the department.

An instructor belongs to only one department, each department offers multiple courses, each of which is taught by a single instructor.

A student may enroll for many courses offered by different departments.

b) Define unary relationship along with example. How do you convert an ER relationship into relation schema? Explain different cardinalities with examples.

«««The End»»»