

**लोक सेवा आयोग**  
नेपाल विविध सेवा, राजपत्रांकित तृतीय श्रेणी,  
कम्प्युटर इन्जिनियर (प्राविधिक) पदको प्रतियोगितात्मक लिखित परीक्षा  
मिति: २०८१/१२/५

समय: ३ घण्टा

पूर्णाङ्क: १००

पत्र: द्वितीय

बिषय: Technical Subject

तलका प्रश्नहरूको उत्तर Section अनुसार छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ।

**Section – A**

**25 Marks**

1. Differentiate between IPv4 and IPv6. Highlight the fundamental features of hubs, bridges, switches and point to point protocol (PPP). 3                      3                      2+3=5
2. Draw and explain the internal architecture of 8085 microprocessor. Consider a byte-addressable computer with 24-bit address, a cache capable of storing a total of 64KB of data and blocks of 32 bytes. Show the format of a 24 bit memory address for direct mapped. 6                      3+3=6                      10
3. Explain the functional description of digital communication system in detail and also explain clearly the applications of digital communication system. 5                      14                      10<sup>5</sup>                      14

**Section – B**

**25 Marks**

4. What is the syntax of multiple inheritance? When such an inheritance is used? Explain with a suitable program. —                      2+1=3                      2'                      1+1+3=5
5. What is integration testing? Differentiate between top-down and bottom-up integration testing. 5                      3+7=10                      12
6. Highlight security management issues in database management system. What are the major elements on concurrent execution of the user programs and transactions? Illustrate with examples. 5                      4+6=10                      12                      26

**Section – C**

**20 Marks**

7. Describe the process of syntax-directed translation in compilers. Mention the importance of data-flow analysis and code optimization in compilers. How do 3D transformations differ from 2D transformations? Write down. 5                      —                      4+3+3=10
8. Design a turing machine to compute addition of two positive integers. Why is turing machine important to computer engineers? State. 4                      = 9                      8+2=10                      35

**Section – D**

**30 Marks**

9. Consider you are an IT expert in the government organization of Nepal and in that organization working 60 staff need five laptops, five desktops and a router for daily operation. Your manager asks you to present a proposal with time, cost and objectives. Write a technical proposal comparing the above mentioned machines available in the market of at least three renowned companies. Your technical proposal must include problems, solution, and findings. 6                      15                      10

contd...

10. Assume that you are hired by ABC company for analyzing their system requirement to computerize their work flow. After few days of study you are able to summarize their business activities as given in the box.

Based on these business activities, make the following.

5+8+7=20

- Level 0 Data Flow Diagram (Context Diagram)
- Level 1 Data Flow Diagram
- E-R model

12

#### Summary of Business Activities for ABC Company

- When customer orders come in, the item master and the customer master files are both updated.
- If an item is out of stock, the inventory control department is notified.
- If the order is from a new customer, a new record is created in the customer master file.
- Picking slips are produced for the customer order and sent to the warehouse.
- A shipping statement is prepared.
- The process of shipping a customer order involves getting the goods from the warehouse and matching up the customer shipping statement, getting the correct customer address and shipping it all to the customer.
- The customer statement is generated and a billing statement is sent to a customer.
- An accounts receivable report is sent to the accounting department.

««The End»»

$$4 + 5 + 5 = 14$$