Reg. No.

II Semester B.Sc. (NEP) Degree Examination, October - 2022
COMPUTER SCIENCE
Data Structures

Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

Answer any four questions from each part.

PART - A

I.   Answer any **Four** questions. Each question carries **2** marks.   (4×2=8)

1.   Define data structure? Mention any two applications of data structure.

2.   List out various asymptotic notations and their significance.

3.   Define linked list. What are the advantages of linked list over arrays?

4.   What is binary tree? Mention the types of representation of Binary tree.

5.   Write the applications of queues.

6.   Define directed graph with an example.

PART - B

II. Answer any **Four** questions. Each question carries **5** marks.   (4×5=20)

7.   Explain

   i.   Time and space complexity.

   ii. Time and speace trade off.

8.   What are the operations on linear arrays? Write an algorithm to insert an element in to array.

9.   Explain memory allocation.

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10. What is recursion? Write an algorithm for tower of hanoi problem.

11. What is depth - first search? Explain with an example.

12. Explain Hash table.

PART - C

III. Answer any **Four** questions. Each question carries **8** marks. (4×8=32)

13. a. What is sparse matrix? Define transpose of sparse matrix.

    b. Explain memory representations of multi - dimensional array. (4+4)

14. a. What is stack? Explain different operations on stack.

    b. Convert the infix expression $A + B * (C - D / E) - F \wedge g$ in to postfix expression using stack (4+4)

15. a. What is queue? Write a program to implement circular queue using arrays.

    b. What is a priority queue? (6+2)

16. Write a C - program to create a single linked list and perform inserting an element at specified position and displays the content of list. (8)

17. a. Explain different ways of representing graph with an example.

    b. Explain different tree traversal methods with an example. (5+3)

18. a. Write a C program to search an element using Binary search technique.

    b. Write an algorithm to sort an array using selection sort and trace the algorithm. (4+4)

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