**( NO. OF PAGES: 2 )**

**(FOR THE CANDIDATES ADMITTED** **23UAI102**

**DURING THE ACADEMIC YEAR 2023 ONLY)** **REG.NO. :**

**N.G.M.COLLEGE (AUTONOMOUS), POLLACHI**

**END-OF-SEMESTER EXAMINATIONS: NOVEMBER- 2023**

**B. Sc (Computer Science with AI & ML)** **MAXIMUM MARKS: 75**

**I SEMESTER** **TIME : 3 HOURS**

**PART - III**

**23UAI102 - DATA STRUCTURES AND APPLICATIONS**

**SECTION – A (10 X 1 = 10 MARKS)**

**ANSWER THE FOLLOWING QUESTIONS. (K1)**

1. Which of the following is a linear data structure?
   a) Arrays b) Trees c) AVL Tree d) Graph
2. Which data structure is based on the Last In First Out (LIFO) principle?
   a) Tree b) Linked List c) Stack d) Queue
3. The number of edges from the root to the node is called _____ of the tree.
   a) Height b) Depth c) Length d) Width
4. Quick sort is also known as
   a) Merge Sort b) Tree Sort c) Shell sort d) Partition and exchange sort
5. What is the time complexity of the binary search algorithm?
   a) O(n) b) O (1) c) O(log2n) d) O(n^2)

**ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)**

6. Define Time complexity.
7. State the different types of linked lists
8. What is a directed graph?
9. Define Sorting
10. Mention the types of searching

**SECTION – B (5 X 5 = 25 MARKS)**

**ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)**

11. a) What is Data structure? Write a brief note on classification of data structure.

    **(OR)**

    b) What do you mean by algorithmic complexity? Write Time complexity and space complexity in brief.
12. a) Write an algorithm to insert and delete an element from an array.Explain with example

    **(OR)**

    b) Define stack. Write an algorithm for basic operations of Push with example

ETHICAL PAPER

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13. a) Define the following terms: i) Root ii) Depth and height of a tree iii) Forest tree

**(OR)**

b) What is directed and undirected graph with example?

14. a) List out the steps for selection sort and illustrate with example.

**(OR)**

b) How the insertion sort is done with the array?

15. a) Give a note on Ordered Linear search

**(OR)**

b) Write an algorithm for Interpolation Search.

## SECTION – C (5 X 8 = 40 MARKS)

**ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)**

16. a) Define Algorithm. Explain the development of an algorithm

**(OR)**

b) Explain Asymptotic Notations in Complexity Analysis of Algorithms

17. a) Describe the operations of queue in detail

**(OR)**

b) List the algorithm to perform to insert and delete a node in a doubly linked list

18. a) Write an algorithm for Inorder, Preorder and Postorder traversal of a binary tree.

**(OR)**

b) Discuss an algorithm for Breadth first Search on a graph

19. a) Illustrate an algorithm to sort the elements using Bubble Sort

**(OR)**

b) Explain Quick Sort with suitable example.

20. a) Write an algorithm for Binary search with suitable example

**(OR)**

b) Describe Fibonacci search in detail

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