Reg. No…….. Name……

M. Sc. DEGREE END SEMESTER EXAMINATION - NOVEMBER 2024

SEMESTER 1: COMPUTER SCIENCE (Artificial Intelligence)

COURSE: **24P1CAIT03 : DATA STRUCTURES AND ALGORITHMS**

(*For Regular 2024 Admission)*

Time: Three Hours Max. Weightage : 30

PART-A

Answer any 8 Questions **Weight : 1**

1. Define Data Structure.
2. Explain the time complexity and space complexity of accessing element by its index in an array of size (n).
3. Define and explain the following asymptotic notations with an example for each : (i) Big O notation (ii) Omega notation (iii) Theta notation.
4. Differentiate between linear data structure and nonlinear data structure with suitable examples.
5. List out the various operations performed on Stack.
6. Explain the implementation of Circular Queue using array.
7. Explain the static and dynamic memory allocations with examples.
8. Write an algorithm for Push and Pop operations on Stack using Linked list.
9. Write short note on B+ tree with suitable algorithm.
10. List the various operations performed on data structure.

(1 x 8 = 8)

PART- B

Answer any 6 Questions **Weights: 2**

11. Explain the static and dynamic data structure.
12. Write the algorithm for converting infix expression to postfix (polish) expression?
13. Explain the Linear queue and Circular queue with suitable example.
14. Explain polynomial addition using singly linked list.
15. Construct binary tree from the preorder and inorder traversal
    Preorder: J C B A D E F I G H
    Inorder: A B C E D F J G I H
16. Implement a circular queue ADT using linked list.
17. Write c++ code for polynomial addition using singly linked list
18. Explain the steps to build a B-tree of order 5 for the following data: 78,21,14,11,97,85,74,63,45,42,57,20,16,19,32,30,31

(2 x 6 = 12)

PART- C

Answer any 2 Questions **Weights: 5**

19. Explain Dijkstra's algorithm with example.
20. Explain the static and dynamic tree table with suitable examples.
21. Explain the concept of (i)Hashing(ii)Hash Table(iii)Collision(iv)Bucket(v)Hash function(vi)Perfect Hash function(vii)Overflow(viii)Full table.
22. Write an algorithm for searching an element using binary search and Linear search. Differentiate the time complexity of Linear and Binary search with examples.

(5 x 2 = 10)