

**3E1202**Roll No. **3E1202**

B.Tech. III Sem. (Main) Examination, April/May - 2022  
Artificial Intelligence & Data Science  
3AID4-05 Data Structures and Algorithms  
AID, CAI, CS, IT

**Maximum Marks : 70****Time : 3 Hours****Instructions to Candidates:**

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (As mentioned in form No. 205).

**PART - A (Word limit 25)****(Answer should be given up to 25 words only) (10×2=20)****(All questions are compulsory)**

1. Define static and dynamic Array. (2)
2. Explain stack. (2)
3. Write differences between Array and Queue. (2)
4. Write Concept of Header linked list. (2)
5. What do you mean by sequential search? (2)
6. Define radix sort. (2)
7. Explain B-tree. (2)
8. Define complete binary tree. (2)
9. How to represent graph in memory? Explain. (2)
10. Explain Double hashing. (2)

**PART - B (Word limit 100)****(Answer should be given up to 100 words) (5×4=20)****(All questions are compulsory)**

1. Convert following infix expression to postfix expression :
  - a.  $A+B/C-D^E-F$ . (2)
  - b.  $A/B-(C+D)*E/F^G$ . (2)
2. Write an algorithm to insert a node in doubly linked list. (4)

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(1)

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3. Explain binary search technique in detail. (4)
4. Discuss the operations performed on a binary tree. (4)
5. Explain minimum spanning tree. Discuss prims algorithm with suitable example. (4)

**PART - C (Any Three)**

(Design/Problem solving skills)

(3×10=30)

Attempt any three questions.

1. a. How to perform factorial calculation using stack? Explain. (5)
- b. Write an algorithm to delete an item from circular Queue. (5)
2. a. Explain circular linked list. Write an algorithm to insert a node into circular linked list. (5)
- b. Discuss insertion sort with suitable example. (5)
3. What is an AVL tree? Explain the concept of balance factor. Create an AVL tree using following sequences : (10)
- 68, 35, 45, 70, 15, 91, 40, 73, 20, 79. (10)
4. Discuss Breadth first search and Depth first search traversal with suitable example. (10)
5. a. Explain Dijkstra's shortest path algorithm in detail. (5)
- b. Write down the algorithm of Bubble Sort. Sort the following elements using Bubble sort : (5)
- 68, 98, 35, 48, 62, 52, 30.