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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (AI & DS/AI & ML/CSE/Block Chain/Cyber
Security/IOT/CSD/ECS/R&AI/Internet of Things and Cyber Security
Including Block Chain Technology) (Sem.-3)**

DATA STRUCTURE & ALGORITHMS

Subject Code : BTCS301-18

M.Code : 76436

Date of Examination : 11-12-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

- a) Using example explain the various rotation operations performed on an AVL tree.
- b) List the importance of data organization through data structures.
- c) How is height and balance factor of a node calculated in a tree?
- d) What is the advantage of B+ tree?
- e) List applications of priority queue.
- f) What is the drawback in applying Binary search over a given list for search operation?
- g) Explain advantage of using linked list over array.
- h) How are elements of a graph stored?
- i) List the various operations on queue with example.
- j) Write steps to convert to post fix expression: $(8-4)*(2+6)-(3*3)$.

SECTION - B

2. Write pseudocode for adding elements of an array row-wise. Derive its time complexity function and obtain the Big O.
3. Explain the concept of insertion in a circular queue giving all possible test cases.
4. Write pseudocode for the various tree traversal techniques.
5. Using the list 24, 5, 35, 17, 12, 16, 21, 10 perform the merge sort step wise.
6. Explain the efficiency of Binary Search Tree during search operation giving example.

SECTION - C

7. Explain the use of stack for function call and return using suitable example. Why is stack used to implement recurrence functions?
8. Explain the data structure used in Breadth first graph traversal. Give the pseudocode for it.
9. Explain the need of hash tables and any one solution for collision resolution using suitable example.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.