

Roll No.

Total No. of Pages : 02

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B.Tech. (IT) (Sem.-3)
DATA STRUCTURE & ALGORITHMS

Subject Code : BTIT-301-18

M.Code : 76391

Date of Examination : 11-06-2024

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) What is the main purpose of using data structures in computer science?
- b) What is the time complexity of linear search in the worst-case scenario?
- c) Briefly describe two basic operations performed on a stack.
- d) What are the advantages of using linked list?
- e) Define the height of a tree. How is it calculated?
- f) What is the purpose of header nodes in a linked list?
- g) Define an AVL tree.
- h) Explain the concept of hashing and its primary objective.
- i) Define a vertex and an edge in a graph.
- j) Write four applications of queue.

SECTION-B

2. What are the various steps involved in insertion sort? Explain with an example.
3. Describe the algorithm for converting an infix expression to postfix notation using a stack.
4. Explain the concept of binary search. How does it differ from linear search?
5. Write down the differences between depth-first search and breadth-first search algorithms.
6. Define Threaded Binary Tree. Explain its advantages and disadvantages as compared to a Standard Binary Tree.

SECTION-C

7. Define linked list. Write the representation of linked lists in memory. Explain various operations which are performed on linked list with examples.
8. a) Sort the following array using selection sort : [9, 2, 7, 1, 5, 4]. Write down the intermediate steps after each iteration,
b) Explain how insertion at the beginning, middle, and end of a circular linked list is performed?
9. Suppose a binary tree T is in the memory. Write a recursive algorithm which find the number of nodes in T and which finds the depth of T?

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.