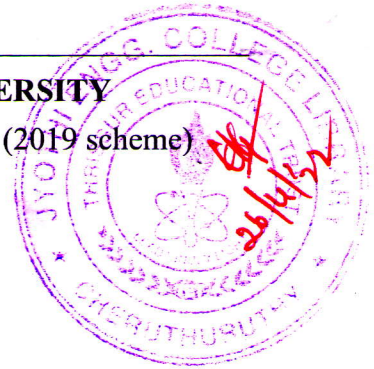


Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Third Semester B.Tech Degree Examination December 2021 (2019 scheme)

**Course Code: CST201****Course Name: DATA STRUCTURES**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer all questions. Each question carries 3 marks*

Marks

- |    |   |     |
|----|---|-----|
| 1  | What are the different criteria that an algorithm should satisfy ?  | (3) |
| 2  | The time complexity of binary search algorithm is $O(\log n)$ justify the statement.  | (3) |
| 3  | Find the postfix expressions of the following infix expression<br>a) $(A+B)*K+D/(E+F*G)+H$<br>b) $((A/D+B)*(K^Y))$  | (3) |
| 4  | Given a matrix having 10 rows and 10 columns and 12 nonzero elements. How much space can be saved by representing the matrix in sparse (tuple) form?        | (3) |
| 5  | Write procedures to push and pop elements from a Linked List Stack  | (3) |
| 6  | Memory blocks of size 202,302 and 101 are allocated for programs of size 150,100, 125, 100 and 100. Which allocation method is better in this case and why? | (3) |
| 7  | Create a Binary Search Tree for the following values 62, 14, 96, 12, 105, 3, 75, 22, 87, 32, 20, 13, 102, 68, 125   | (3) |
| 8  | Explain an application of a graph with an example   | (3) |
| 9  | Write an algorithm to sort a set of numbers using insertion sort  | (3) |
| 10 | Explain the following terms<br>a) Overflow<br>b) Collision  | (3) |

**PART B***Answer any one full question from each module. Each question carries 14 marks***Module 1**

- |    |   |      |
|----|---|------|
| 11 | a) Write an algorithm to find the number of occurrence of each element in an array and calculate the frequency count of the algorithm | (10) |
|    | b) Compare Top-Down approach with Bottom-Up approach  | (4)  |

- 12 a) Write an algorithm for Insertion Sort and calculate the frequency count. (10)  
b) What is the significance of Verification in System Life Cycle (4)

**Module 2**

- 13 a) Discuss an algorithm to convert an infix expression to a postfix expression (8)  
b) Write an algorithm to find the transpose of a matrix represented in tuple form (6)
- 14 a) Write algorithms to insert and delete elements from a circular Queue (6)  
b) Write an algorithm to add two polynomials represented using arrays (8)

**Module 3**

- 15 a) Explain memory allocation for fixed sized blocks with the help of an algorithm (9)  
b) Explain Worst-fit allocation with an example (5)
- 16 a) Write algorithms to multiply two polynomials represented using linked list (8)  
b) Write algorithms to insert elements and delete elements from the beginning of a Circular Double Linked List (6)

**Module 4**

- 17 a) How can we find the depth of a tree. Write an algorithm to find depth of a tree (6)  
b) Write an algorithm to delete a node from a Binary Search Tree (8)
- 18 a) Write algorithms for Depth First Search and Breadth First Search of a Graph (10)  
b) Explain the term Complete Graph with an example (4)

**Module 5**

- 19 a) Explain the algorithm for Merge Sort with an example (10)  
b) Why is Merge Sort preferred for Linked List (4)
- 20 a) Explain with examples the different techniques for open addressing (9)  
b) How Folding method can be used for Hashing (5)

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