

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Third Semester B.Tech Degree Examination December 2020 (2019 Scheme)

Course Code: ITT201
Course Name: DATA STRUCTURES

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions. Each question carries 3 marks

- | | | Marks |
|----|---|-------|
| 1 | What is Spars matrix? | (3) |
| 2 | Explain Time Complexity. | (3) |
| 3 | Differentiate Singly Linked List and Doubly Linked List. | (3) |
| 4 | Explain the dynamic representation of memory. | (3) |
| 5 | Describe the schematic diagram of the stack. | (3) |
| 6 | What are the different applications of the Queue? | (3) |
| 7 | What is the adjacency matrix? | (3) |
| 8 | How is a Full Binary Tree differ from Complete Binary Tree? | (3) |
| 9 | What is the Hash function? | (3) |
| 10 | What are the general approaches to avoid the collision? | (3) |

PART B

Answer any one full question from each module. Each question carries 14 marks

Module 1

- | | | |
|----|---|------|
| 11 | Explain the algorithm for Linear Search and Binary Search with example. What are the differences between Linear Search and Binary Search? | (14) |
| 12 | a) Explain the classifications of data Structures. | (5) |
| | b) Explain Time Complexity and Space Complexity. | (9) |

Module 2

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|----|--|------|
| 13 | a) Write the Polynomial representation of the Polynomial $7X^4+5X^3+3X^2+7X+8$. Give an algorithm to perform the addition of two Polynomials using Linked List. | (10) |
| | b) Explain the array representation of the Linked List. | (4) |
| 14 | What is Doubly Linked List? Describe an algorithm to perform the following operations on Doubly Linked List. | (14) |

- i) Insert at front.
- ii) Delete from rear.
- iii) Insert at any position.
- iv) Traversal.

Module 3

- 15 a) Explain the array representation of stack. Give the algorithm to perform operations of a stack using an array. (12)
- i) PUSH() ii) POP() iii) STATUS()
- b) What are the different applications of the stack? (2)
- 16 a) Describe an algorithm to evaluate postfix expression. Evaluate the following postfix expression using the algorithm. $A B * C D - * E F ^ /$ where $A=50, B=10, C=23, D=13, E=5$ and $F=2$. (10)
- b) Explain array and Linked List representation of Queue. (4)

Module 4

- 17 a) Explain Graph traversals with examples. (8)
- b) Explain the Shortest Path problem. (6)
- 18 a) What is an Expression Tree? Create the expression tree for the following expression $x=(a + b) / ((c * d) - e)$. (4)
- b) Construct a Binary Search Tree using values 50,70,60,20,90,10,40,100.
- i) Explain Binary Search Tree deletion algorithm.
 - ii) Delete node 70 and reconstruct the tree. (10)

Module 5

- 19 Define Hashing. Explain any four Hashing Techniques with example. (14)
- 20 a) Explain the Separate Chaining technique. (4)
- b) What is Closed Hashing? Suppose the size of the Hash Table is 11. The hash function is $H1(K) = K \pmod{11}$. Show how the key values $K=\{16,12,27,23,8,41,13\}$ stored in the Hash Table using the following techniques. (10)
- i) Linear Probing
 - ii) Double Hashing where $H2(K)=7 - (K \pmod{7})$
