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 criterions 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	(3)

     a) (A+B)*K+D/(E+F*G)+H

     b) ((A/D+B)*(K^Y))

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	(3)

     a) Overflow

     b) Collision

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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