Seat No.: _____ Enrolment No. 102CTBMCS21220038

NATIONAL FORENSIC SCIENCES UNIVERSITY

(Delhi Campus)

Mid Semester Examination - November 2022

B.Tech.- M.Tech.(Cyber Security)

Subject Code: CTBTCSE SIII P2 **Date: 09/11/22**

Subject Name: Data Structure

Time: 11:30 – 1:00 pm **Total Marks: 50**

Instructions:

1. **Attempt all questions. Functional coding in C or C++ should be given.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1		Attempt all Questions:	
	(a)	Explain the *liner* and *non-liner* Data Structures with example. Or Explain queue and circular queue with example and their differences.	**04**
	(b)	Explain the bubble sort with example.	**05**
	(c)	Explain the insertion of a node in a sorted linked list.	**07**
Q.2		Attempt any 3 questions:	
	(a)	Calculate the Time Complexity of following expression. $T(n)=4T(n/2)+n^2$	**06**

	(b)	Calculate the Time Complexity of following code of programme.
		For (i=1; i<=n;)
		i=i*2;
			06

	(c)	Find the θ bound for given function. $f(n)=n^2/2-n/2$	**06**
	(d)	Find the lower bound for given function.. $f(n)=5n^2$	**06**
Q.3		Attempt any 2 questions:	
	(a)	Explain the shell sort with code of functional programme.	**08**
	(b)	Discuss postfix evaluation using stacks.	**08**
	(c)	What is asymptotic analysis? Why it is called asymptotic analysis? Discuss the guideline for these analyses.	**08**

Seat No.: 4819 Enrolment No. 102CTBMCS2122038

NATIONAL FORENSIC SCIENCES UNIVERSITY

B.Tech. - M.Tech. Computer Science & Engineering (Cyber Security) - Semester – III

Examination – January-2023

Subject Code: CTBTCSE SIII P2 **Date:10/01/2023**

Subject Name: Data Structures

Time: 11:00 Am to 2:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

			Marks
Q.1	(a)	What is Data Structure? Explain Linear and Non-Linear data structures.	05
	(b)	Explain Best Case, Average Case and Worst Case time complexities for linear search.	05
	(c)	What is Stack? Write algorithms for any two operations of Stack.	07
		OR	
	(c)	Convert following Infix expression to Postfix expression and show the stack trace: a + b * c -d /e * h	07
Q.2	(a)	Differentiate: Simple Queue Vs Circular Queue.	05
	(b)	Construct Binary Tree from following Pre-Order and In-Order Traversals: Pre-Order: G B Q A C K F P D E R H In-Order: Q B K C F A G P E D H R	05
	(c)	Sort he following data using Bubble Sort: 42, 23, 74, 11, 65, 58, 94, 36, 99, 87	07
		OR	
	(c)	What is Queue? List operations of queue. Write algorithm for any one operation of queue.	07
Q.3	(a)	Write algorithm for Binary Search and explain it with example.	08
	(b)	Differentiate: Singly Linked List, Circular Linked List and Doubly Linked List.	08
Q.4	(a)	Perform the following operations on circular queue of size 3 and show the status of front and rear pointer at each step: Insert 1, Insert 2, Insert 3, Insert 4, Delete 1, Insert 4	05
	(b)	Explain Adjacency Matrix and Adjacency List representation of graph.	05
	(c)	Write algorithm for insert at first place in singly linked list.	07
		OR	
	(c)	What is Hashing? Explain any one collision resolution strategy with example.	07

Q.5 (a) Differentiate: DFS and BFS Traversal. 05

(b) Explain Threaded Binary Tree in detail. 05

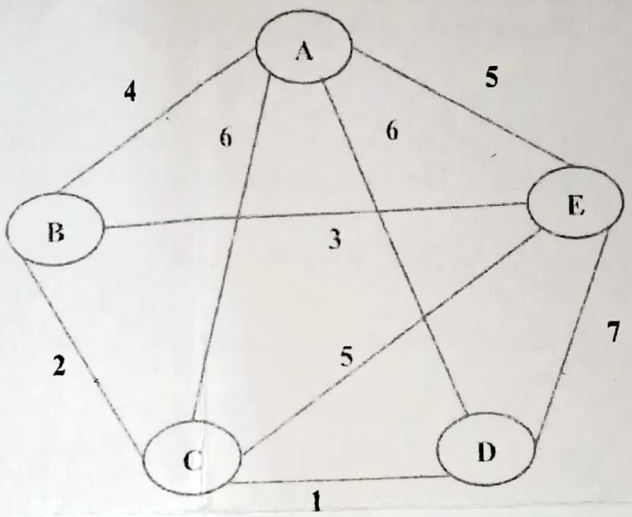
(c) Explain file structures in detail. 07

OR

(c) Construct AVL Tree from given Sequence: 07
10, 20, 30, 40, 50, 60, 70

Q.6 (a) Construct Binary Serach Tree from following sequence and Find Preorder, Inorder and Postorder Traversal of it: 08
10, 3, 15, 22, 6, 45, 65, 23, 78, 34, 5

(b) Construct Minimum Spanning Tree from following graph using Kruskal's Algorithm: 08



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NATIONAL FORENSIC SCIENCES UNIVERSITY

B.Tech. – M.Tech. (Cyber Security) III Sem - Jan-2023

Practical Examination

Subject Code: CTBTCSE SIII L1 **Date: 17/01/2023**

Subject Name: Data Structure & Algorithm

Time: 10:00 AM – 1:00 PM **Total Marks: 100**

Instructions:

1. **Write down each question on separate page.**
2. **Attempt all questions.**
3. **Make suitable Code in C or C++**

		Marks
Q.1	Implement the two stacks in a single array.	**30**
Q.2	Implement the bubble sort and find out the time and space complexities. best avg S= O(n) O(n²)	**30**
Q.3	Implementation of BFS traversal on Graph and explain their applications.	**40**