

Seat No.: _____

Enrolment No. 402CTBMC82122**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 <i>liner</i> and <i>non-liner</i> 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.: [REDACTED]

Enrolment No. 102CTBMS [REDACTED]

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

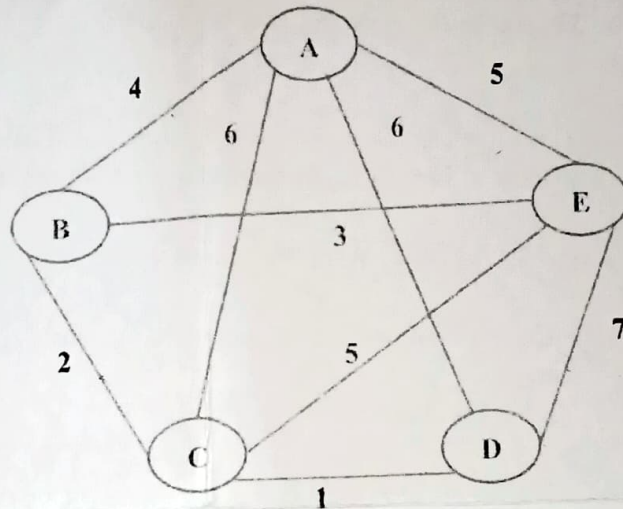
Total Marks: 100

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 the 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 Search 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



END OF PAPER

Seat No.: [REDACTED]

Enrolment No. 102CTBMCS21 [REDACTED]

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. \therefore $\begin{matrix} \text{best} \\ S = O(n) \end{matrix}$ $\begin{matrix} \text{avg} \\ O(n^2) \end{matrix}$	30
Q.3 ✓	Implementation of BFS traversal on Graph and explain their applications.	40