

Course Code	: 2101CS301	Date	: 17-05-2024
Course Name	: Data Structure	Duration	: 150 Minutes
		Total Marks	: 70

Instructions:

1. Attempt all the questions.
2. Figures to the right indicates maximum marks.
3. Make suitable assumptions wherever necessary.

Q.1 (A) Define Data Structure. Differentiate between Linear and Non-Linear data structure. **4**

(B) List and explain various operations on data structures. **3**

OR

Define Array. State and explain applications of Array.

(C) Write algorithms for PUSH and POP operations of stack. **7**

OR

Write algorithm to convert infix to postfix expression.

Q.2 (A) Write algorithm to insert an element into Circular Queue. **4**

(B) Write a note on Priority Queue. **3**

OR

Differentiate between Array and Linked List.

(C) Write algorithm for inserting a node at the end of the Singly Linked List. **7**

OR

Write algorithm for inserting a node at the beginning of the Circular Linked List.

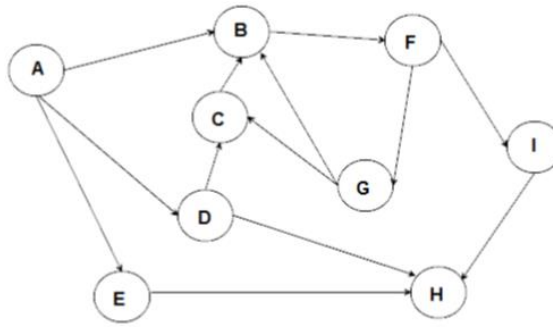
Q.3 (A) Construct BST for following sequence and find inorder traversal for the same. **4**
35, 46, 29, 2, 24, 68, 44, 57, 1, 22, 79, 71

(B) Construct AVL tree for following sequence: **3**
10, 20, 30, 40, 50, 60, 70, 80

OR

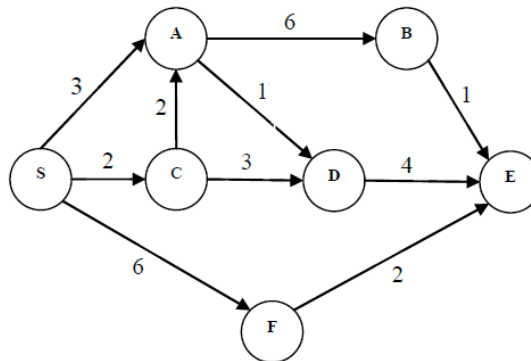
Construct 5-Way Tree from the given list of nodes:
1,7,6,2,11,5,10,13,12,20,16,24,3,4,18,19,14,25

(C) Find DFS and BFS traversal for the given graph below: **7**



OR

Find Minimum Spanning Tree from the given graph below:



- Q.4 (A)** Explain how the collision occurs in Hashing. Also state and explain different Collision Resolution Techniques in detail. **4**

- (B)** Write a note on Multiplicative Hashing in detail. **3**

OR

Write a note on Division method in detail.

- (C)** Using hash function $K \bmod 5$, insert following sequence of keys in the hash table: **7**
(Using Quadratic Probing)
50, 700, 76, 85, 92, 73, 101

OR

Using hash function $K \bmod 5$, insert following sequence of keys in the hash table:
(Using Linear Probing)
50, 700, 76, 85, 92, 73, 101

- Q.5 (A)** Search the number 50 from the given data using binary search technique. **4**
Illustrate the searching process. 10, 14, 20, 39, 41, 45, 49, 50, 60

- (B)** Write an algorithm for Selection Sort. **3**

OR

Write an algorithm for Bubble Sort.

- (C)** Apply Quick sort algorithm to the following elements: **7**
29 15 11 82 22 17 53 57 4 8

OR

Apply Insertion sort algorithm to the following elements:
29 15 11 82 22 17 53 57 4 8
