Enrollment No.: _____

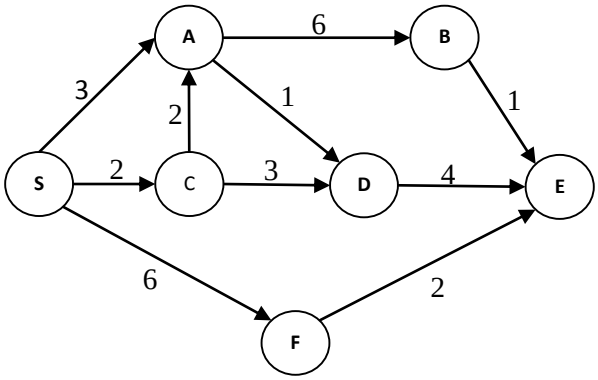
Darshan UNIVERSITY
योगः कर्मसु कौशलम्

Darshan Institute of Engineering & Technology
B.Tech. | Sem-3 | Summer-2023

Course Code	:	2101CS301	**Date**	:	21-04-2023
Course Name	:	Data Structure	**Duration**	:	150 Minutes
			Total Marks	:	70

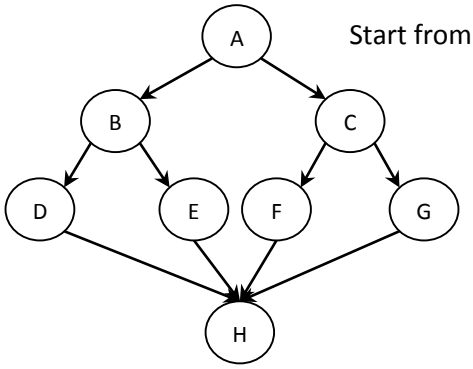
Instructions:
1. Attempt all the questions.
2. Figures to the right indicates maximum marks.
3. Make suitable assumptions wherever necessary.

Q.1	**(A)**	Define Data Structure. Draw classification of Data Structure.	**4**
	(B)	Differentiate between Linear and Non Linear Data Structure.	**3**
		OR	
		Define Complexity. Explain Time and Space Complexity.	
	(C)	State algorithms for following operations on Stack: PUSH, POP, PEEP, CHANGE	**7**
		OR	
		Write an algorithm to evaluate POSTFIX Expression.	
Q.2	**(A)**	Consider an example where the size of the circular queue is four elements. Initially the queue is empty. It is required to insert symbols 'A','B' and 'C'. Delete 'A' and 'B' and insert 'D' and 'E'. Show the trace of the contents of the queue.	**4**
	(B)	Discuss an algorithm to delete an element from the Simple Queue.	**3**
		OR	
		Define Queue. Also state applications of Queue.	
	(C)	State an algorithm to delete a node from Singly Linked List.	**7**
		OR	
		State an algorithm to insert a node in an Ordered Linked List.	
Q.3	**(A)**	Differentiate: BFS and DFS.	**4**
	(B)	Construct AVL tree for following sequence: 10, 20, 30, 40, 50, 60, 70 ,80	**3**
		OR	
		Construct BST for following sequence and find inorder traversal for the same. 35, 46, 29, 2, 24 ,68, 44, 57, 1, 22, 79, 71	
	(C)	Apply Dijkastra's algorithm for the following graph with node S as the staring node:	**7**



OR

Find BFS and DFS of the following Graph:



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

(B) Explain the working of Folding method of hashing in detail. **3**

OR

Explain the working of Multiplicative Hashing in detail.

(C) Using hash function Kmod7, insert following sequence of keys in the hash table: (Using Linear Probing) **7**
50,700,76,85,92,73,101

OR

Using hash function Kmod7, insert following sequence of keys in the hash table: (Using Quadratic Probing)
50,700,76,85,92,73,101

Q.5 **(A)** Write an algorithm for Binary Search (Iterative Approach) **4**

(B) Explain the working of Insertion sort by taking following array as an example: **3**
77, 33, 44, 11, 88, 22, 66, 55

OR

Apply merge sort algorithm to the following elements:
20, 10, 5, 15, 25, 30, 50, 35

(C) Give the similarities and dissimilarities between Quick sort and Merge sort techniques. **7**

OR

Compare sequential searching with binary searching in detail.

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