

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

[illegible]

Course Code

2	2	C	S	6	4	1
---	---	---	---	---	---	---

DATA STRUCTURES AND APPLICATIONS

Max. Marks: 100

2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTl:CO: PI)</u>
<u>Module-1</u>			
1.	a. Define data structure. List the characteristics and its classification of data structures.	10	(2 :1: 1.2.1)
	b. Write an algorithm for any operations on one dimensional array. (i) Inserting an element at a given valid position (ii) Searching a key element in a array (using Linear Search)	10	(2 :1: 2.2.1)
(OR)			
2.	a. Define two-dimensional array. Demonstrate declaration and initialization of two dimensional array with a program.	10	(2 :1: 2.2.1)
	b. Write the structure and union declaration and initialization with suitable program.	10	(2 :1: 1.2.1)
<u>Module-2</u>			
3.	a. Write an algorithm to perform the following stack operations (i) Push Operation (ii) Pop Operation	10	(2 :2: 1.2.1)
	b. Define recursion. Write a C program to generate Fibonacci series using recursion.	10	(2 :2: 2.2.2)
(OR)			
4.	a. List and explain different types of Queues with neat diagram.	10	(2 :2: 1.2.1)
	b. Write a C function or algorithm to perform the following operations on normal Queue (i) Insert an element in a Queue (ii) Delete an Element from a Queue	10	(2 :2: 2.2.1)
<u>Module-3</u>			
5.	a. List and explain different dynamic memory allocation functions with suitable program.	10	(2 :3: 1.2.1)
	b. Write an algorithm to perform the following operations on singly linked list (i) Insert a node at the ending of the linked list (ii) Delete a node at the beginning of the linked list	10	(2 :3: 2.2.1)

Page 1 of 2

(OR)

- | | | | | |
|----|----|---|----|---------------|
| 6. | a. | Write a C function to implement insert, delete and print functions in singly linked list. | 10 | (2 :3: 2.2.1) |
| | b. | Write a C function to implement push, pop and display of stack using linked list (Implementation of singly linked list) | 10 | (2 :3: 2.2.1) |

Module-4

- | | | | | |
|----|----|--|----|---------------|
| 7. | a. | Define binary tree. Explain the properties of binary trees. | 10 | (2 :4: 1.2.1) |
| | b. | Explain array and linked representation of binary trees with suitable example. | 10 | (2 :4: 1.2.1) |

(OR)

- | | | | | |
|----|----|---|----|---------------|
| 8. | a. | Write the C recursive functions to perform inorder, preorder and postorder traversals in a binary tree. | 10 | (2 :4: 2.2.1) |
| | b. | Define the following terms and give examples:
(i) Tree (ii) Root (iii) Edge (iv) Height (iv) depth | 10 | (2 :4: 1.2.1) |

Module-5

- | | | | | |
|----|----|--|----|---------------|
| 9. | a. | Define the following terms with examples
(i) Graph (ii) Directed graph (iii) Undirected graph | 10 | (2 :5: 1.2.1) |
| | b. | Explain adjacency matrix and adjacency list representations of a graph with example. | 10 | (2 :5: 1.2.1) |

(OR)

- | | | | | |
|-----|----|--|----|---------------|
| 10. | a. | Write the C function/algorithm for depth first search traversal (BST traversal method) in a graph and explain with an example. | 10 | (2 :5: 2.2.1) |
| | b. | Explain different collision resolution techniques in Hash function with examples. | 10 | (2 :5: 1.2.1) |

*** ** *