Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN										Course Code	2	1	C	S	5	5	1

Fifth Semester B.E. Degree Examinations, April/May 2024

INTRODUCTION TO DATA STRUCTURES

Duration: 3 hrs **Max. Marks: 100**

Note: 1. Answer any* FIVE *full questions choosing ONE full Question from each Module.
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO:PI)*
		Module-1		
1.	**a.**	Define data structures. Explain the types of data structures with examples.	**06**	(2 :1: 1.4.1)
	b.	List the different operations performed on arrays. Explain any two operations with respective algorithms and give examples.	**07**	(3 :1: 1.4.1)
	c.	Write a C program to demonstrate the declaration and initialization of two-dimensional arrays. Also display the elements.	**07**	(2 :1: 1.7.1)
		(OR)		
2.	**a.**	What are structures? How they are different from arrays? Give the general syntax to declare a structure and explain with an example.	**06**	(2 :1: 1.4.1)
	b.	Write a C program to add two complex numbers using structures.	**08**	(3 :1: 1.7.1)
	c.	Write a C program to calculate area of triangle and area of circle using user defined functions.	**06**	(3 :1: 1.7.1)
		Module-2		
3.	**a.**	Define stack. Give example and explain memory representation of stack.	**06**	(2 :2: 1.4.1)
	b.	Write algorithms to perform following operations on stack: (i) Push (ii) Pop (iii) Display	**09**	(3 :2: 1.4.1)
	c.	Define recursion. Write a C program to generate Fibonacci series up to N.	**05**	(3 :2: 1.7.1)
		(OR)		
4.	**a.**	What is queue? Explain the logical representation of queues.	**06**	(2 :2: 1.4.1)
	b.	Write C functions to perform insert, delete and display operations on queue.	**09**	(3 :2: 1.7.1)
	c.	Write a short note on different types of queues.	**05**	(3 :2: 1.4.1)
		Module-3		
5.	**a.**	Define pointer. Explain pointer concept with suitable program.	**06**	(2 :3: 1.6.1)
	b.	Illustrate the use of dynamic memory allocation functions.	**08**	(3 :3: 1.7.1)
	c.	Discuss self-referential structures in C with suitable Example.	**06**	(2 :3: 1.7.1)
		(OR)		

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI– Performance Indicator)

6.	**a.**	Explain different types of linked list with a suitable logical representation.	**05**	(2 :3: 1.7.1)
	b.	Give the algorithms to perform following operations on singly linked list of integers. (i) Create a node (ii) Insert a node at the beginning of linked list (iii) Delete a node from the end of linked list (iv) Display the nodes of linked list	**12**	(3 :3: 2.5.3)
	c.	List the advantages and disadvantages of linked lists.	**03**	(2 :3: 1.7.1)

Module-4

7.	**a.**	Define the following terms and give examples (i) Tree (ii) Binary tree (iii) Degree of a node (iv) Depth of the tree	**08**	(2 :4: 1.6.1)
	b.	Write the procedures to perform inorder, preorder and postorder traversals and give all three traversal sequences for the binary tree shown in Fig. Q7(a).	**12**	(3 :4: 2.5.3)

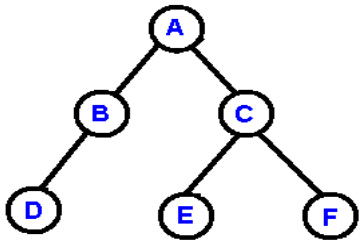

Fig. Q7(a)

(OR)

8.	**a.**	Explain the properties of binary trees.	**06**	(2 :4: 1.7.1)
	b.	Construct BST for the following sequence of nodes and perform inorder, preorder and post order traversals 80,24,46,15,78,112,92,35,82,15.	**08**	(3 :4: 2.5.3)
	c.	Explain the recursive searching procedure to search a key element in binary search tree (BST) with an example.	**06**	(3 :4: 1.7.1)

Module-5

9.	**a.**	Define the following terms and give examples (i) Graph (ii) Sub graph (iii) Simple Path (iv) Cycle (v) Degree of a node	**10**	(2 :5: 1.6.1)
	b.	Explain the adjacency matrix and adjacency list representation of graphs. Write the adjacency matrix and adjacency list for the graph shown in Fig. Q9(b).	**10**	(3 :5: 2.5.3)

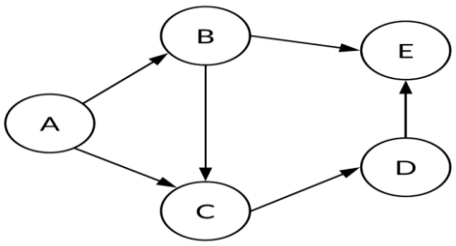

Fig. Q9(b)

(OR)

10	**a.**	Write the C Function/algorithm for Depth First Search traversal in a graph and explain with an example.	**06**	(3 :5: 2.6.1)
	b.	Explain different hash functions with examples.	**08**	(2 :5: 1.7.1)
	c.	What do you mean by collision? Explain collision resolution using linear probing with example.	**06**	(2 :5: 1.7.1)

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Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI– Performance Indicator)