CBCS SCHEME

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BEC405D

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Data Structure using C

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Mention the various memory allocation techniques? Outline how dynamic memory is allocated for array with C program.	10	L2	CO1
	b.	Describe the following array operations with algorithm and example for each : (i) Inserting an element (ii) Deleting an element (iii) Traversing (iv) Binary search	10	L2	CO1
		OR			
Q.2	a.	Explain how two-dimensional arrays are represented in memory with an example.	10	L2	CO1
	b.	What is a pointer? Mention the uses of pointers? Explain the process of declaration, initialization and access the value printed by printer.	10	L2	CO1
		Module – 2			
Q.3	a.	Define stack and illustrate an ADT of stack. Implement push and pop functions for stack using arrays with stack full and stack empty conditions.	10	L2	CO2
	b.	Convert the infix expression $\left(\left(a/(b-c+d)\right)*(e-a)*c\right)$ to postfix expression. Describe a function to evaluate the postfix expression and trace for the given data a = 6, b = 3, c = 1, d = 2, e = 4	10	L3	CO2
		OR			
Q.4	a.	Write an algorithm and function to convert a valid infix expression to postfix expression. Demonstrate the same function with example. (using stack).	10	L3	CO2
	b.	Write a function to evaluate a postfix expression and trace the same for the expression ab/c – de*+ac* given a = 2, b = 2, c = 3, d = 4, e = 2	10	L3	CO2
		Module – 3			
Q.5	a.	What is a linked list? Classify the various types of linked list with a neat diagram.	10	L2	CO3
	b.	Discuss the four functions to implement circular DLL (Doubly Linked List) using header.	10	L3	CO3
		OR			
Q.6	a.	With node structure show how would you store the polynomials in linked list? Write a C function for adding two polynomials represented as circular lists.	10	L3	CO3

	b.	Discuss a C function to perform the following : (i) Reversing a single linked list. (ii) Concatenating single linked list (iii) Finding the length of the list.	10	L3	CO3
		Module – 4			
Q.7	a.	Develop a binary tree from the given preorder and inorder sequence : (i) Preorder : A B D G C E H I F (ii) Inorder : D G B A H E I C F	10	L3	CO4
	b.	Describe C functions for the following tree traversals : (i) Inorder (ii) Preorder (iii) Postorder	10	L3	CO4
		OR			
Q.8	a.	Discuss recursive functions for the following operations on BST : (i) Insert_key ( ) (ii) Deletekey ( ) (iii) Search_key ( )	10	L3	CO4
	b.	Construct BST for the following : 22, 28, 20, 25, 15, 18, 10, 14	10	L3	CO4
		Module – 5			
Q.9	a.	What is collision? Outline different collision resolution techniques.	10	L2	CO5
	b.	What is AVL tree? Construct an AVL tree with following data : 10 15 9 12 13 79 45 36 22	10	L3	CO5
		OR			
Q.10	a.	What is the special property of Red Black tree? Illustrate the Red Black tree insertion and deletion operation with an example.	10	L2	CO5
	b.	Outline the function to insert an element to, (i) AVL tree (ii) Red Black tree (iii) B-tree	10	L3	CO5

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