CBCS SCHEME

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BCS304

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
Data Structures and Applications

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.	What is data structure? List and explain data structure operations.	08	L2	CO1
	b.	Discuss four dynamic memory allocation functions.	08	L2	CO1
	c.	With suitable example, discuss self-referential structures.	04	L2	CO1
		OR			
Q.2	a.	What is sparse matrix? Give the triplet form for given matrix and also find its transpose.	06	L3	CO2

A =

	0	1	2	3
0	10	0	0	40
1	11	0	22	0
2	0	0	0	0
3	20	0	0	50
4	0	15	0	25

	b.	Explain ADT stack.	07	L2	CO2
	c.	Define Stack. Implement the operations of stack using arrays.	07	L1	CO2
		Module – 2			
Q.3	a.	What is the advantage of circular queue over ordinary queue? Discuss the implementation of circular queue operations.	08	L2	CO2
	b.	Demonstrate multiple stacks and queues with suitable examples.	12	L2	CO2
		OR			
Q.4	a.	Explain Linked Stacks and Queues operations.	10	L2	CO2
	b.	Give the C functions for the following on singly linked list with example: i) Insert a node at the beginning ii) Delete a node at the front iii) Display	10	L3	CO3
		Module – 3			
Q.5	a.	Define linked list? Implement C function for the following circular Doubly linked list: i) Insert a node at the beginning ii) Delete a node at the end iii) Display	10	L3	CO3
	b.	Develop a function to delete a node whose information field is specified in singly linked list.	10	L3	CO3
		OR			
Q.6	a.	What is a tree? With suitable example, define i) Complete binary tree ii) Degree of the tree iii) Level of a node	07	L2	CO4
	b.	List and explain representation of a binary tree?	07	L2	CO4
	c.	Explain In-threaded binary tree.	06	L2	CO4

		Module – 4			
Q.7	**a.**	For the given data, draw a binary search tree. 100, 85, 45, 55, 110, 20, 70, 65	**07**	**L3**	**CO4**
	b.	List and explain the common operations of binary search tree.	**07**	**L2**	**CO4**
	c.	Explain about forests.	**06**	**L2**	**CO2**
		OR			
Q.8	**a.**	Define graph. Explain graph abstract data types.	**10**	**L2**	**CO4**
	b.	Explain the elementary graph operations.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Define hashing. Explain types of hashing functions in detail.	**10**	**L2**	**CO5**
	b.	Explain static hashing and dynamic hashing in detail.	**10**	**L2**	**CO5**
		OR			
Q.10		Write a short note on :			
	a.	Leftist trees	**06**	**L2**	**CO4**
	b.	Optimal binary search tree	**07**	**L2**	**CO5**
	c.	Priority queues	**07**	**L2**	**CO2**

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