

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. <div style="margin-left: 40px;"> <table style="border-collapse: collapse;"> <tr> <td style="padding-right: 10px;">0</td> <td style="padding-right: 10px;">1</td> <td style="padding-right: 10px;">2</td> <td style="padding-right: 10px;">3</td> <td></td> </tr> <tr> <td style="padding-right: 10px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">10</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">40</td> </tr> <tr> <td style="padding-right: 10px;">1</td> <td style="border: 1px solid black; padding: 2px 5px;">11</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">22</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> </tr> <tr> <td style="padding-right: 10px;">2</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> </tr> <tr> <td style="padding-right: 10px;">3</td> <td style="border: 1px solid black; padding: 2px 5px;">20</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">50</td> </tr> <tr> <td style="padding-right: 10px;">4</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">15</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">25</td> </tr> </table> </div>	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	06	L3	CO2
	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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