CBCS SCHEME

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BCS304

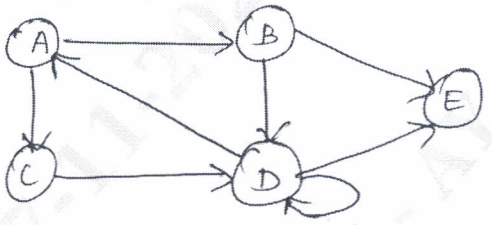
Third Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

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.	Define Data Structures.	04	L1	CO1
	b.	Explain the classification of Data Structures with example.	10	L2	CO1
	c.	Explain all operations of Data Structures.	06	L2	CO1
		OR			
Q.2	a.	Explain any five string handling functions supported by 'c' with syntax and example.	10	L2	CO1
	b.	Convert the following infix expression to postfix expression using stack: A + (B * C – (D/E ^ F) * G) * H	10	L3	CO1
		Module – 2			
Q.3	a.	List the disadvantages of linear queue and how is it solved in circular queues. Give the algorithm to insert and delete an element in circular queues.	12	L2	CO2
	b.	Explain in detail about multiple queues with relevant functions in 'C'.	08	L2	CO2
		OR			
Q.4	a.	Develop a linked list with the basic operations performed on Singly Linked List (SLL) and different types of linked list.	12	L3	CO2
	b.	Examine a node structure for linked representation of polynomial. Explain algorithm to add two polynomial represented using linked list.	08	L2	CO2
		Module – 3			
Q.5	a.	Summarize Sparse Matrix. For the given sparse matrix, write the diagrammatic linked list representation. $\begin{bmatrix} 8 & 0 & 0 & 0 \\ 5 & 0 & 0 & 3 \\ 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 8 \\ 0 & 0 & 9 & 1 \end{bmatrix}$	08	L3	CO3
	b.	Define Doubly linked list. Write the functions to perform the following operations on doubly linked list. (i) Insert a node at rear end of the list (ii) Delete a node at rear end of the list (iii) Search a node with a given key value	12	L3	CO3
		OR			
Q.6	a.	Define Tree with any six tree terminology.	06	L1	CO3
	b.	Write the function for copying and testing of binary tree.	06	L3	CO3
	c.	Draw a binary tree and find out the binary tree traversals for the following expression 3 + 4 *(7 – 6)/4 + 3.	08	L3	CO3

		Module – 4			
Q.7	**a.**	Construct binary search tree for the given set of values 14, 15, 4, 9, 7, 18, 3, 5, 16, 20 Also perform inroder, preorder and post order traversals of the obtained tree.	**08**	**L3**	**CO4**
	b.	Build a linked list representation of disjoint sets in detail.	**06**	**L3**	**CO4**
	c.	Simplify recursive search algorithm for a binary search tree.	**06**	**L3**	**CO4**
		OR			
Q.8	**a.**	Compare a graph with tree. For the graph shown in Fig.Q8(a), show the adjacency matrix and adjacency list representation.  Fig.Q8(a)	**08**	**L3**	**CO4**
	b.	Explain all methods used for traversing a graph with suitable example and write 'C' function for the same.	**12**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Differentiate between static hashing and dynamic hashing in detail with operations.	**10**	**L2**	**CO5**
	b.	Describe double ended priority queue.	**04**	**L2**	**CO5**
	c.	Explain Hashing with any three Hash functions.	**06**	**L2**	**CO5**
		OR			
Q.10	**a.**	What is collision? Explain the method to resolve collision with suitable algorithm of linear probing. Insert keys 72, 27, 36, 24, 63, 81, 92, 101 into % [size 10].	**10**	**L3**	**CO5**
	b.	Construct an optimal binary search tree for the following keys with the probabilities as Keys: A, B, C, D, E Probability: 0.25, 0.2, 0.05, 0.2, 0.3	**10**	**L3**	**CO5**

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