Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec 2024

CA5CO34 Data Structures & Algorithms

Programme: MCA \ BCA-MCA (Integrated) Branch/Specialisation: Computer Application

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	When new data are to be inserted into a data structure, but there is no available space, this situation is usually called- (a) Underflow (b) Overflow (c) Overwhelmed (d) Saturated.	**1**	01	02	02	
	ii.	The postfix form of the expression X+(Y*Z) is- (a) XYZ*+ (b) XYZ+* (c) XY+Z* (d)XY*Z+	**1**	02	02	02	
	iii.	In which data structure insertion take place only at the other end(rear) and delection from one end (front)? (a) Linked list (b) Stack (c) Tree (d) Queue	**1**	01	02	05	
	iv.	Five people P,Q,R,S and T are standing in a queue.R is standing between P and T.P is just behind Q and Q is second in the Queue. Who is second last in the queue? (a) T (b) S (c) R (d) P	**1**	02	02	06	
	v.	In doubly linked lists, traversal can be performed? (a) Only in forward direction (b) Only in reverse direction (c) In both directions (d) None of these	**1**	01	02	08	

P.T.O.

vi.	What would be the asymptotic time complexity to find an element in the linkedlist? (a) O(1) (b) O(n) (c) $O(n^2)$ (d) None of these	**1**	02	01	05
vii.	The time complexity of the binary search is- (a) O(n) (b) $O(\log_2 n)$ (c) $O(n\log_2 n)$ (d) $O(n^2)$	**1**	02	05	05
viii.	Merge sort uses which of the following technique to implement sorting? (a) Backtracking (b) Greedy algorithm (c) Divide & conquer (d) Dynamic programming	**1**	01	04	06
ix.	The number of nodes in a complete binary tree of level 5 is _____. (if level starts from 1) (a) 64 (b) 67 (c) 32 (d) 63	**1**	02	04	04
x.	The Depth First Search traversal of graph will result into? (a) Linked List (b) Tree (c) Graph with back edges (d) Array	**1**	01	03	05

Q.2	i.	Describe the term data structure. Also define the term linear and non-linear data structure.	**2**	01	02	02
	ii.	Define ADT stack. Explain the operation performed on stack.	**3**	01	02	05
	iii.	Write a complete C program for the implementation of stack operations using array.	**5**	03	03	06
OR	iv.	Define infix, prefix and postfix expression. Convert infix to postfix expression- K + L - M*N + (O^P) * W/U/V * T + Q	**5**	02	03	08
Q.3	i.	What is circular queue? Also explain drawback of linear queue.	**2**	01	02	04
	ii.	Write a complete C program for the implementation of circular queue operation using array.	**8**	03	03	06

OR	iii.	Write a C program for linked list implementation of queue.	**8**	03	03	08
Q.4	i.	Write the advantages of doubly linked list over single linked list.	**3**	02	02	03
	ii.	Write an algorithm to insert a node at first and last position in single linked list.	**7**	03	03	06
OR	iii.	Write a C program for the implementation of insert a node at first and last position in the doubly linked list. Write main function to call other functions.	**7**	03	03	08
Q.5	i.	Explain binary search with the help of example.	**4**	02	04	03
	ii.	Write a C program to sort an array using selection sort.	**6**	03	03	05
OR	iii.	Sort the array using merge sort- 10 90 20 30 60 100 70 50 40 80.	**6**	03	04	06
Q.6		Attempt any two:				
	i.	Write Short note on- (a) Complete Binary tree (b) Minimum spanning tree	**5**	02	03	05
	ii.	Explain how BFS and DFS work with the help of an example.	**5**	01	04	06
	iii.	Construct a binary tree having the following traversal sequences: Preorder traversal: ABDEFCGHJLK Inorder reaversal: DBFEAGCLJHK	**5**	03	04	08

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Marking Scheme

CA5CO34 (T) Data Structures & Algorithms (T)

Q.1	i)	b) Overflow	**1**
	ii)	a) XYZ*+	**1**
	iii)	d) queue	**1**
	iv)	c)R	**1**
	v)	c) In both directions	**1**
	vi)	(b) O (n)	**1**
	vii)	(b) O (log_2n)	**1**
	viii)	c)divide and conquer	**1**
	ix)	d)63	**1**
	x)	b)Tree	**1**

Q.2	i.	Data structure definition Types definition	1Mark 1Mark	**2**
	ii.	Definition 1Marks Operation 2Marks		**3**
	iii.	Given marks for push 2M, pop 2M and display 1M		**5**
OR	iv.	Given Marks for each steps		**5**
Q.3	i.	Definition 1M drawback 1M		**2**
	ii.	Given Marks insertion 3M, deletion 3M and display 2M		**8**
OR	iii.	Given Marks insertion 3M, deletion 3M and display 2M		**8**
Q.4	i.	1 Advantage 1M	3*1=3	**3**
	ii.	Insert First Insert Last	3.5 marks 3.5 marks	**7**
OR	iii.	Main function 3M first 2M last function 2M		**7**
Q.5	i.	Explain 2M Example 2M		**4**
	ii.	Given step wise marks		**6**
OR	iii.	Given step wise marks		**6**
Q.6	i.	1)Definition 2M Diagram 0.5M 2) Definition 2M Diagram 0.5M		**5**
	ii.	For BFS 2.5M For DFS 2.5M		**5**
	iii.	Given Step Wise Marks		**5**

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P.T.O.