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BEC405D

## Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Data Structures 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.	Define Data Structure. Classify the data structure with examples.	08	L2	CO1
	b.	Define Pointer. With a suitable example, explain why pointer variables are passed to functions.	08	L3	CO1
	c.	Distinguish Structure and Unions.	04	L2	CO1
		OR			
Q.2	a.	Describe three dynamic memory allocation functions with syntax.	06	L2	CO1
	b.	Discuss a C program to read an array of 5 numbers from console and display the sum of numbers.	08	L3	CO1
	c.	What is Array? Mention different types of arrays.	06	L2	CO1
		Module – 2			
Q.3	a.	What is Stack? Discuss basic operations of stack using array representation with algorithm.	08	L2	CO2
	b.	Apply the algorithm to evaluate this prefix expression: $+ - 2\ 7 * 8 / 4\ 12$	06	L3	CO2
	c.	Develop a C program to find factorial of a given number using recursive functions.	06	L3	CO2
		OR			
Q.4	a.	Describe an algorithm to convert an infix notation to postfix notation and apply the algorithm for the following infix expression to convert it into postfix $A - (B / C + (D \% E * F) / G) * H$	08	L3	CO2
	b.	What is recursion? With example, distinguish base case and recursive case in recursion function.	06	L2	CO2
	c.	Discuss tower of Hanoi problem and show the pictorial representation for 3 disks.	06	L2	CO2
		Module – 3			
Q.5	a.	What is queue? Describe the process insert and delete operation of queues with algorithm using array representation.	06	L2	CO3
	b.	Discuss in detail about Josephus problem.	07	L2	CO3
	c.	Outline the working of priority queue with a suitable example.	07	L2	CO3
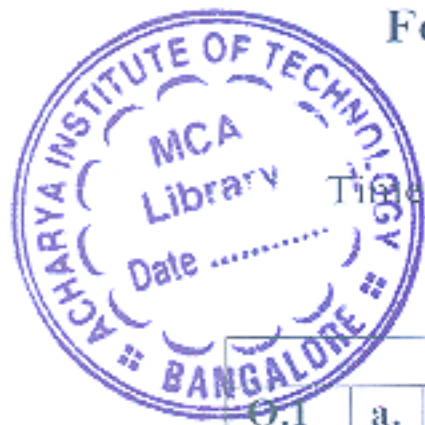
		OR			
Q.6	a.	Discuss the advantages of linked list over array representation.	02	L2	CO3
	b.	Develop a C program to implement queue using circular list.	08	L3	CO3
	c.	What is circular linked list? Describe with algorithm to delete the first node and the last node of the circular linked list.	10	L3	CO3

Module – 4

Q.7	a.	What is binary tree? With suitable example, define (i) Level of the binary tree (ii) Complete binary tree (iii) Degree of the tree	10	L2	CO4
	b.	Illustrate inserting and deleting a node in a binary search tree with algorithm and example.	10	L3	CO4

		OR			
Q.8	a.	Construct a Huffman Tree and generate codeword for the following symbol and its frequency	10	L3	CO4

Symbol	A	B	C	D	E	F	G	H	I
Frequency	15	6	7	12	25	4	6	1	15

	b.	Distinguish pre-order, in-order traversal with example and also write algorithm.	10	L2	CO4

Module – 5

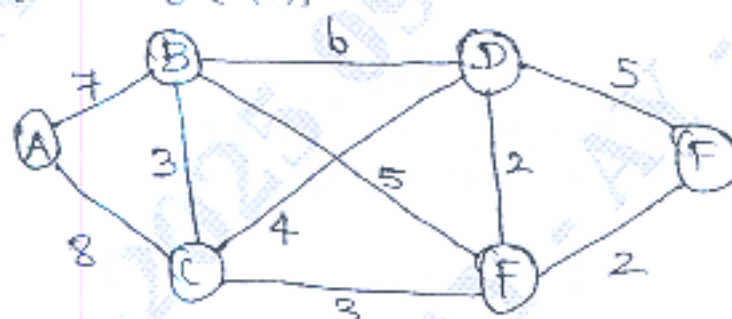|					
Q.9	a.	Define graph compare adjacency matrix and adjacency list representation of graphs.	10	L2	CO5
	b.	Construct minimum cost spanning tree using Kruskal's algorithm for the following graph [Refer Fig.Q9(b)]	10	L3	CO5

Fig.Q9(b)

		OR			
Q.10	a.	Briefly discuss static and dynamic hashing techniques.	06	L2	CO5
	b.	Describe Prim's algorithm with suitable example.	10	L2	CO5
	c.	Explain the following with an example: (i) Complete graph (ii) Disconnected graph (iii) Self-loop (iv) Directed graph	04	L1	CO5

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