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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: VI**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 19EC6PE3DS **Max Marks: 100**
Course: Data Structure and Applications

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. All codes must be supported by comments and sample output.

UNIT - I

1 a) Discuss template function in C++. Develop a C++ program using template function to swap two parameters with arguments being two integers and two float values **06**

b) Create a linked list. Include functions to insert and delete data at specific positions. **10**

c) What is a Linear List? Explain the ADT linear list. **04**

UNIT - II

2 a) Explain the row-major function for a three- dimensional array with an example. **06**

b) Define Sparse matrices and also explain the representation using single linear list. **07**

c) Discuss about tridiagonal matrix and develop a function to get a tridiagonal matrix. **07**

OR

3 a) What is an array? Explain the ADT specification of an array. **06**

b) Express the following matrix in linear list representation. Create a sparse matrix for the same and include store function in your codes. **10**

15	0	0	22
0	11	3	0
0	0	0	-6
0	0	0	0
91	0	0	0
0	0	28	0

c) Define Matrix. Explain different types of square matrix with an example. **04**

UNIT - III

4 a) Define Stack. Explain the ADT stack. **06**

	b)	Develop a C++ template class to implement stack in linked list representation. Define the member function for pop and push operations.	**08**
	c)	With an example, discuss machine shop simulation and explain how it works?	**06**

OR

5	a)	Define Queue. Explain the ADT Queue.	**06**
	b)	Discuss problem description and solution strategy for towers of Hanoi.	**08**
	c)	Convert the infix expression to postfix expression also evaluate the postfix expression. Consider the value of A=4 , B=6,C=3,D=4,E=8 ((A * ((B+C)*D)) + E)	**06**

UNIT - IV

6	a)	Define Binary Tree. Difference between binary tree and tree.	**06**
	b)	List and explain the different binary tree traversal methods.	**07**
	c)	Write a function to search for an element in binary search tree.	**07**

UNIT - V

7	a)	Explain insertion and deletion operations on a Max heap with suitable example. Consider [58, 73, 82, 96, 15, 18, 2, 50] and build a MaxHeap.	**10**
	b)	Consider the string ‘abbabbababababbbaa’ and explain LZW compression technique.	**10**

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