B.N.M. Institute of Technology

An Autonomous Institution under VTU

Department of Artificial Intelligence and Machine Learning

Semester End Assessment

Semester: III **Max Marks: 100**

Course: Data structures and Applications **Course code: 23AML134**

Instructions:

1. **Answer all the questions from Part A – (30 Marks)**
2. **Write and execute one program from Part B – (70 Marks)**

Sl. No.	Design, Develop and Implement a Program in C	CO	POs/ PSOs
1	Convert an Infix Expression to Postfix Expression. Program should support for both parenthesized and free parenthesized expressions with the operators: +, -, *, /, % (Remainder), ^ (Power) and alpha numeric operands.	1	1,2,3,4,5, 9,10,11/1
2	Evaluation of postfix expression with single digit operands and operators: +, -, *, /, %, ^ using Stack.	1	1,2,3,4,5, 9,10,11/1
3	Implement a menu driven for the following operations on Circular QUEUE of Character. Array Implementation of Queue with maximum size MAX a) Insert b) Delete c) Demonstrate Overflow and Underflow situations on Circular QUEUE d) Display the status of Circular QUEUE	1	1,2,3,4,5, 9,10,11/1
4	Implement a menu driven on Singly Linked List of Student Data. (USN, Name) a) Create a SLL of N Students Data by using front insertion. b) Display the status of list and count the number of nodes in it Perform c) Deletion at End of the list d) Deletion at front of the list e) Insertion at end of the list	2	1,2,3,4,5, 9,10,11/1
5	Implement a menu driven Doubly Linked List perform a) Create a DLL N Data by using front insertion. b) Display the status of list and count the number of nodes in it c) Deletion at End of the list d) Deletion at front of the list e) Insertion at end of the list	2	1,2,3,4,5, 9,10,11/1

6	**Find maximum depth or height of complete binary tree.**	3	1,2,3,4,5, 9,10,11/1
7	**Implement Binary Search Tree (BST) of Integers.** **i. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2** **ii. Traverse the BST in Inorder, Preorder and Post Order** **iii. Search the BST for a given element (KEY) and report the appropriate message**	3	1,2,3,4,5, 9,10,11/1
8	**Print all the path from root to leaf /left path for given binary tree.**	3	1,2,3,4,5, 9,10,11/1
9	**Construct MAX-Heap.**	4	1,2,3,4,5, 9,10,11/1
10	**Implement hashing technique and collision resolution technique.**	4	1,2,3,4,5, 9,10,11/1
11	**Create a Graph of N cities using Adjacency Matrix. Print all the nodes reachable from a given starting node in a digraph using DFS.**	5	1,2,3,4,5, 9,10,11/1
12	**Create a Graph of N cities using Adjacency Matrix. Print all the nodes reachable from a given starting node in a digraph using BFS.**	5	1,2,3,4,5, 9,10,11/1
13	**Create a Graph of N cities using Adjacency Matrix and find if there is a path between two vertices in a directed graph.**	5	1,2,3,4,5, 9,10,11/1
14	**Create a Graph of N cities using Adjacency Matrix to detect Cycle in a Directed Graph.**	5	1,2,3,4,5, 9,10,11/1

Course Outcomes:

1. Apply and implement fundamental data structures like stacks, queues, and pattern matching algorithms. (Apply)
2. Apply and manipulate various types of linked lists, including practical applications such as polynomial addition. (Apply)
3. Demonstrate the ability to use tree structures for different traversal methods and implement binary search trees for data retrieval and manipulation. (Apply)
4. Apply heap trees, hash tables, and AVL trees for efficient data management. (Apply)
5. Apply graph theory concepts and algorithms to solve graphical problems effectively. (Apply)