25900042 **Reg.No : .....**

Name : .....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-BCA(Honours) REGULAR EXAMINATION MARCH 2025

SECOND SEMESTER

Core Course (CC) - MG2CCRBCA101 - DATA STRUCTURES

(2024 ADMISSION ONWARDS)

Duration: 2 Hours **Maximum Marks: 70**

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer all questions

Each question carries **2** marks

1. Explain the memory representation of a linear array. [U] / [CO1]
2. Explain the role of a stack when evaluating a postfix expression. Provide an example to illustrate how the stack is used. [U] / [CO2]
3. Describe how a singly linked list is represented in memory. [U] / [CO3]
4. Describe connected graphs using a suitable example. [U] / [CO4]
5. Distinguish a priority queue and a normal queue? [An] / [CO2]

[2x5 = 10]

Part B

Short Answer Questions

Answer any **5** questions

Each question carries **6** marks

6. Describe different types of time complexity analysis with suitable examples. [U] / [CO1]

7. Write the algorithm for the "push" operation in a stack. Discuss the limitations of using arrays for implementing stacks. [An] / [CO2]

8. Distinguish between closed hashing and open hashing. [An] / [CO3]

9. Compare binary trees and binary search trees with examples. [An] / [CO4]

10. Explain the Insertion Sort algorithm. Describe its working with an example. [U] / [CO1]

11. Write an algorithm or a program to traverse a singly linked list and print all its elements. [A] / [CO3]

12. Analyze the advantages and disadvantages of using an AVL tree over a standard Binary Search Tree. [An] / [CO4]

[6x5 = 30]

Part C

Essay Questions

Answer any **2** questions

Each question carries **15** marks

13. Explain two dimensional arrays in c. Write a c program to find the row sum of a matrix. [A] / [CO1]

14. Explain the array implementation of a simple queue and circular queue with algorithms and examples. [An] / [CO2]

15. Define recursion. What are the applications of recursion? Discuss the significance of run time stack in recursive program implementation. [An] / [CO3]

[15x2 = 30]