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Reg.No : .....

Name : .....

**MAHATMA GANDHI UNIVERSITY, KOTTAYAM**  
**MGU-BCA (HONOURS) Regular EXAMINATION October 2025**  
**Third SEMESTER**  
**Core Course (CC) - MG3CCRBCA203 - DESIGN AND**  
**ANALYSIS OF ALGORITHMS**  
**(2024 ADMISSION ONWARDS)**

**Duration: 1 Hour 30 Minutes**

**Maximum Marks: 50**

*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. Given the code, give the space complexity (in terms of auxiliary space): [An] / [CO1]  
function f(n):  
if n == 0: return 1  
temp = array of size n  
return f(n-1) + temp
2. Define Recursion. [K] / [CO1]
3. What is the advantage of Quick Sort over Merge Sort? [U] / [CO2]
4. Discuss the worst-case complexity of binary search. [U] / [CO2]
5. Why does Strassen's algorithm use addition and subtraction operations along with multiplication? [U] / [CO2]
6. Explain how the Divide and Conquer technique is applied to find the maximum and minimum values in a list of elements. [U] / [CO2]
7. Define biconnected components. [K] / [CO3]

8. Define principle of optimality [K] / [CO3]
9. List any two characteristics of BFS. [K] / [CO3]
10. Define Backtracking. [K] / [CO3]
- [2x10 = 20]**

### **Part B**

Short Answer Questions

Answer any **3** questions

Each question carries **5** marks

11. List out the advantages of using algorithm. [U] / [CO1]
12. Explain the divide and conquer general method? [U] / [CO2]
13. List the major steps in designing an algorithm using the greedy strategy. [K] / [CO2]
14. Write the step-by-step procedure of Dijkstra's Algorithm. [U] / [CO2]
15. Explain the Sum of Subsets problem with an algorithm. Solve it using the data set  $S = \{3, 5, 6, 7\}$  with  $d = 15$ . [An] / [CO3]

**[5x3 = 15]**

### **Part C**

Essay Questions

Answer any **1** questions

Each question carries **15** marks

16. Discuss in detail the working mechanism, data structures used, and efficiency of Prim's algorithm. Illustrate with a suitable example [An] / [CO2]
17. Apply Hamiltonian cycle algorithm to find cycles in a 6-vertex complete graph. [A] / [CO3]

**[15x1 = 15]**