



K24U 0184

Reg. No. :

Name :

**Sixth Semester B.C.A. Degree (C.B.C.S.S. – OBE – Regular/
Supplementary/Improvement) Examination, April 2024
(2019 to 2021 Admissions)**

Core Course

6B17BCA : DESIGN AND ANALYSIS OF ALGORITHM

Time : 3 Hours

Max. Marks : 40

**PART – A
Short Answer**

Answer **all** questions :

(6×1=6)

1. What is meant by algorithm design ?
2. When can a sorting algorithm be referred to as stable ?
3. What is the importance of algorithm analysis in decision making ?
4. What is meant by solving recurrences ?
5. What elements contribute to the reusability of algorithmic components within the framework of an algorithm's structure ?
6. What is the number of scalar multiplications in two $n \times n$ matrices ?

**PART – B
Short Essay**

Answer **any 6** questions :

(6×2=12)

7. What is pseudocode ? Give an example.
8. State the principle of optimality. How does it influence the efficiency of dynamic programming approach ?

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9. Define the following related to backtracking.
 - a) Live node.
 - b) E node.
 - c) Success node.
 - d) Dead node.
10. What is asymptotic notation ?
11. What is referred as 'Time complexity' ?
12. How should control statements and iterative statements analysed in algorithm ?
13. What is meant by Huffman code ?
14. What is Prim's algorithm ? How can the time complexity of Prim's algorithm be optimized ?

PART - C

Essay

Answer any 4 questions :

(4×3=12)

15. What is randomization ? How does it help to improve the speed of Quick sort algorithm ?
16. Explain the significance of algorithm analysis.
17. How is substitution method applied for solving recurrences ? Show an example.
18. An array has exactly n nodes. They are filled from the set $\{0, 1, 2, \dots, n-1, n\}$. There are no duplicates in the list. Design an $O(n)$ worst case time algorithm to find which one of the elements from the above set is missing in the array.
19. What are the advantages and disadvantages of Strassen's algorithm ?
20. What is a minimum spanning tree ? How does Kruskal's algorithm ensure that no cycles are formed ?



PART – D
Long Essay

Answer **any 2** questions :

(2×5=10)

21. What considerations should be taken into account when making decisions prior to the design of an algorithm ?
22. Differentiate between dynamic programming approach and divide and conquer approach.
23. Explain Big O notation and Big omega notation in detail.
24. Using the divide and conquer approach to find the maximum and minimum in a set of 'n' elements. Also find the recurrence relation for the number of elements compared and solve the same.

