Enrollment No_____

KADI SARVA VISHWAVIDYALAYA

B.E. (CE/CSE) SEMESTER – V KSV EXAMINATION APRIL -2025

SUBJECT CODE: - CE504-N **SUBJECT NAME: - Design & Analysis of Algorithm**

DATE: - 15/04/2025 **TIME: - 12:30 pm to 3:30 pm** **MARKS: -70 Marks**

Instructions:

1. Answer each section in separate Answer Sheet.
2. All questions are **compulsory.**
3. Indicate clearly, the options you attempted along with its respective question number.
4. Assume suitable data wherever necessary.
5. Use of scientific calculator is permitted.

SECTION-I

Q-1 (A) How do you define the algorithm? What are the different characteristics of an algorithm? [05]

(B) Write an algorithm of Insertion sort. Derive its complexity. [05]

(C) Explain Asymptotic notations with examples. [05]

OR

(C) Give the recursive algorithm to find Fibonacci series. [05]

Q-2 (A) Explain Radix sort algorithm with an example. [05]

(B) Write down the algorithm of Quick sort and trace the given dataset. [05]
50,30,10,90,80,20,40,70

OR

Q-2(A) Explain Binary search algorithm with example. [05]

(B) Solve the below mentioned recurrence relation using Master's Theorem? [05]

1. $T(n) = 4T(n/2) + n^2$
2. $T(n)= 4T(n/2) + n^3$

Q-3(A) Explain Strassen's algorithm for matrix multiplication. [05]

(B) Solve the following Activity Selection problem with given data where S_i and F_i are the starting time and finishing time respectively. [05]

A	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}
S_i	1	3	0	5	3	5	6	8	8	2	14
F_i	4	5	6	7	8	9	10	11	12	15	16

OR

Q-3(A) Find the Solution of the fractional Knapsack Problem n=3, M=50 kg and Profit Vector (60, 100, 120) and Weight Vector (10, 20, 30) using Greedy approach. [05]

(B) Explain Kruskal's Algorithm to find the Minimum Spanning Tree on the graph. [05]

SECTION-II

Q-4(A) Define following terms: (i) Space complexity (ii) Adjacency Matrix (iii) Spanning tree (iv) Time Complexity (v) Principal of Optimality [05]

(B) Differentiate between Greedy Algorithm and Dynamic Programming. [05]

(C) Given two sequence of characters, X = BCDAACD, Y = ACDBAC. Obtain the longest common subsequence. [05]

OR

(C) Given four matrices, find out optimal sequence for matrix chain multiplication A1, A2, A3 and A4 be four matrices of dimensions 10 x 30, 30 x 5 and 5 x 60 respectively. [05]

Q-5(A) What is DFS? Explain with example. [05]

(B) Explain Pre-conditioning in traversing trees. [05]

OR

Q-5(A) What is BFS? Explain with example. [05]

(B) Describe shortest path algorithm with example. [05]

Q-6(A) Explain Backtracking Method. Give any one solution of 4-Queen problem using backtracking method. [05]

(B) Differentiate between NP hard and NP complete problem. [05]

OR

Q-6 (A) Describe Min-Max Principle in details with example. [05]

(B) Explain Travelling Salesman problem with example. [05]

Best of Luck