Roll No. .

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J-FB-22-00309

B.Tech. EXAMINATION, 2022

Semester V (CBCS)

ANALYSIS AND DESIGN OF ALGORITHM

(CSE, IT)

CS-506

Time : 3 Hours *Maximum Marks : 60*

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. (a) Define algorithms and its characteristics. **5**

(b) What do you understand by efficient algorithm ? Discuss all cases. **5**

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2. (a) Write an algorithm for MAX HEAP. **5**

(b) Consider the recurrence relation $T(n) = 9T\left(\frac{n}{3}\right) + n^{2.5}$. (Master method). **5**

Section B

3. (a) Write binary search algorithm and analyze its time complexity. **5**

(b) What do you understand by convex hull problem ? **5**

4. (a) Explain Radix sort with example. **5**

(b) Explain optimal binary search tree with example. **5**

Section C

5. (a) Explain Traveling salesman problem with an example. **5**

(b) Explain Prim's algorithm with an example. **5**

6. Write the backtracking algorithm for the sum of subsets problem using the state space tree corresponding to $m = 35$, $w = (20, 18, 15, 12, 10, 7, 5)$. **10**

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Section D

7. Write an algorithm for basic Ford-Fulkerson algorithm. **10**

8. Explain P, NP, NP-Hard, NP-Complete. **10**

(Compulsory Question)

9. Write short notes on the following : **2×10=20**

   (a) Algorithm

   (b) Worst case analysis

   (c) Recurrence

   (d) Divide and conquer

   (e) Greedy method

   (f) Single source shortest path

   (g) All pair shortest path.

   (h) Subset sum problem.

   (i) Complexity

   (j) Polynomial time.

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