Roll No. .....

Total Pages : 04

Jan-21-R-29

B. Tech. EXAMINATION, Jan. 2021

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

1×10

1. Define recurrence relation. Solve the recurrence relation using recursive tree method :

$$T(n) = 3T\left(\frac{n}{8}\right) + n.$$

2. What is an algorithm and explain its characteristics. Explain methods of amortize analysis of algorithm.

Section B 1×10

3. Explain convex-hull problem. Also differentiate between Divide and Conquer and Dynamic Programming Algorithm.

4. Determine the cost and structure of an optimal binary search tree for $n = 7$ keys with the following probabilities :

i	p_i	q_i
0		0.06
1	0.04	0.06
2	0.06	0.06
3	0.08	0.06
4	0.02	0.05
5	0.10	0.05
6	0.12	0.05
7	0.14	0.05

Section C 1×10

5. What are the differences between greedy approach and dynamic programming approach ? Given n jobs J_1, J_2....J_n having executing deadlines d_1, d_2...d_n. Design an algorithm using greedy approach to schedule these jobs as per earliest deadline first.

6. What is subset sum problem ? Write the exact subset sum problem.

Section D 1×10

7. Define the maximum flow in the flow network. Explain Ford-Fulkerson Algorithm for finding maximum flow in flow network.

8. What is sorting network ? Explain comparison network and merging network in detail.

(Compulsory Question)

9. Write short notes on any *five* of the following : 5×4=20

(a) Big-oh notation of complexity.

(b) Radix sort

(c) Multistage graphs

(d) Kruskal's algorithm

(e) NP-complete problems

(f) Cook's theorem