[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2127)

17221(N)

B. Tech 5th Semester Examination

Analysis and Design of Algorithm (CBS)

CS-506

Time : 3 Hours Max. 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 of the section A, B, C and D of the question paper and all the subparts of the section E (compulsory).

SECTION - A

1. (a) Explain the term Big-oh, Big-omega and Big-theta. Show that a function $f=3n^2+4n+7$ is big theta of n^2. (6)

   (b) Discuss the Amortized analysis with an example. (6)

2. (a) Explain the method of determining the complexity of procedure by the step count approach. Illustrate with an example. (6)

   (b) Explain towers of Hanoi problem and solve it using recursion. (6)

SECTION - B

3. (a) Define convex hull in 2D. Explain the gram's scan algorithm for computing convex hull and analyze it. (6)

   (b) Write Divide - And - Conquer recursive Quick sort algorithm and analyze the algorithm for average time complexity. (6)

4. (a) Derive the time complexity of Quick sort algorithm for worst case. (6)

(b) Find an optimal solution to the knapsack instance n=7 objects and the capacity of knapsack m=15. The profits and weights of the objects are (P1,P2,P3, P4, P5, P6, P7)= (6,5,15,7,6,18,3)(W1,W2,W3,W4,W5,W6,W7)= (2,3,5,7,1,4,1) (6)

SECTION - C

5. (a) Discuss the single - source shortest paths algorithm with suitable example. (6)

(b) What is the concept of randomized algorithm? Write an algorithm of approx. vertex cover problem and analyze it. (6)

6. (a) Construct an optimal travelling sales person tour using Dynamic Programming.

0	6	9	3
5	0	6	2
9	6	0	7
7	3	5	0

(6)

(b) Discuss Sum of subset problem with example. (6)

SECTION - D

7. (a) What is NP completeness? What approaches are used in proving NP-completeness of the problems? "Proving a problem as NP-complete is considered as good contribution in computer science" why? Justify with strong argument. (6)

(b) Write a note on Cryptographic. (6)

8. (a) Write a note on polynomial vs non polynomial complexity. (6)

(b) Discuss Ford-Fulkerson algorithm with example. (6)

SECTION - E
(Compulsory)

9. (i) What is Amortized analysis of algorithms and how is it different from Asymptotic analysis?

(ii) In how many passes does the Merge sort technique sorts the following sequence 3, 27, 4, 11, 45, 39, 2, 16, 56?

(iii) What is the importance of knapsack algorithm in our daily life?

(iv) Differentiate linear search and binary search techniques..

(v) Distinguish between Merge sort and quick sort.

(vi) Explain Recursive Binary search algorithm with suitable examples. (2×6=12)