Roll No. ....   Total No. of Pages : 2

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B.Tech (CSE) (Sem.–5)
DESIGN AND ANALYSIS OF ALGORITHMS
Subject Code : CS-307
Paper ID : [A0467]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY.**
2. **Attempt any FOUR questions from SECTION-B.**
3. **Attempt any TWO questions from SECTION-C.**

SECTION-A   (10 × 2 = 20 Marks)

l. Answer the following briefly :

   (a) How is time complexity measured?

   (b) What is significance of the lower bound of an algorithm?

   (c) What is a deterministic algorithm?

   (d) What do you mean by the running time of an algorithm?

   (e) What are P and NP problems?

   (f) What is the working principle of quicksort?

   (g) What are the various tree traversal techniques?

   (h) What are important characteristics of dynamic programming?

   (i) What are NP-complete algorithms ?

   (j) Name various set algorithms.

SECTION-B   (4 × 5 = 20 Marks)

2. What do you analyze in an algorithm? What is the basis of analysis? Explain.

3. Explain the concepts of NP, NP-Hard and NP completeness.

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4. What is dynamic programming? How is this approach different from recursion? Explain.

5. Explain in detail quick sorting method. Provide a complete analysis of quick sort.

6. Find the Big-Oh notations for the following functions:

   (i) f(n) - 78889 (ii) f(n) = $6n^2 + 135$ (iii) f(n) = $7n^2 + 8n + 56$

   (iv) f(n) = $n^4 + 35n^2 + 84$

SECTION-C   (2 × 10 = 20 Marks)

7. Explain various set operations in detail.

8. Consider five items along with their respective weights and values

   I = <il, i2, i3, i4, i5>

   w = <5,10,20,30,40>

   v = <30,20,100,90,160>

   The capacity of the knapsack W=60. Find the solution for the fractional knapsack problem.

9. Discuss any string matching algorithm with illustrative example.