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**Question Paper Code : 60379**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016

Fourth Semester

Computer Science and Engineering

CS 2251/CS 41/CS 1251/080230013/10144 CS 402 — DESIGN AND ANALYSIS OF ALGORITHMS

(Regulations 2008/2010)

(Common to PTCS 2251/10144 CS 402 — Design and Analysis of Algorithms for B.E. (Part-Time) Third Semester – Computer Science and Engineering – Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give an example for conditional asymptotic notation.
2. List out any two properties of big-Oh notation.
3. Define divide and conquer approach.
4. Write a pseudocode to search an element from an array of 'n' elements.
5. What is the difference between the dynamic programming method and greedy method?
6. Write down the uses of binary search trees.
7. State the property of graph coloring.
8. Define a Hamiltonian cycle.
9. State the difference between FIFO and LC branch-and-bound algorithm.
10. What do you mean understand by the term articulation point in a graph? State its use.

PART B — (5 × 16 = 80 marks)

11. (a) With an example, explain how recurrence equations are solved.

Or

- (b) Write an algorithm for linear search. Analyse the algorithm and state its time and space complexity. Compare the same with binary search method.

12. (a) Explain merge sorting with an example. Prove that time complexity is  $\theta(n \log n)$  using recurrence equation.

Or

- (b) With a suitable example, show how knapsack problem can be solved using divide and conquer method.

13. (a) Explain all-pairs shortest path problem with an example.

Or

- (b) Consider the Travelling Salesperson instance defined by the following cost matrix.

$$\begin{pmatrix} & 20 & 30 & 10 & 11 \\ 15 & & 16 & 4 & 2 \\ 3 & 5 & & 2 & 4 \\ 19 & 6 & 18 & & 3 \\ 16 & 4 & 7 & 16 & \end{pmatrix}$$

Draw the state space tree and show the reduced matrices corresponding to each of the node.

14. (a) Explain 8 Queens problem with an example.

Or

- (b) With an example, explain graph coloring problem.

15. (a) Write notes on the following

- (i) Bi-connected components
- (ii) NP-Hard and Np-Completeness.

Or

- (b) Discuss branch and bound technique in detail.