G 3531

M.C.A. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

MC 1653 — DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the different criteria used to improve the effectiveness of algorithm?

2. Define Big Omega notation.

3. Give any two differences between internal and external sort.

4. What are the main aspects of greedy method?

5. Give an application for Knapsack problem.

6. Define optimal solution.

7. Define subset problem.

8. Give the application of backtracking technique.

9. Define graph coloring.

10. Distinguish between P class problems with NP class problems.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the following terms :

     (i)   Searching.   (4)

     (ii) Assymptotic notations.   (4)

     (iii) Analysis framework.   (4)

     (iv) Algorithm efficiency.   (4)
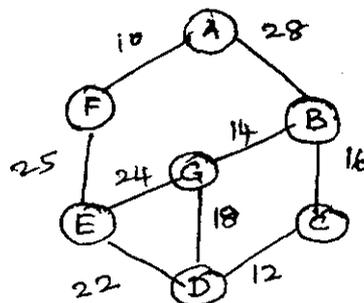
Or

     (b) Explain in detail about mathematical analysis of non–recursive
          algorithm with suitable examples.   (16)

12. (a) Describe in detail about mergesort algorithm and justify the benefits of
          mergesort with suitable example.   (16)

Or

     (b) (i)   Explain in detail about Kruskal's algorithm.   (8)

          (ii) Find the minimum spanning tree using Krushal's algorithm for the
                given graph.   (8)

13. (a) Explain in detail about Warshall's algorithm with suitable example. (16)

Or

     (b) Explain an algorithm to find optimal binary search tree with example.(16)

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14. (a) (i) Explain the algorithm for Knapsack problem according to backtracking problem. (5)

(ii) Explain in detail about Hamiltonian circuit problem. (11)

Or

(b) (i) Explain in detail about subset–sum problem with suitable example. (10)

(ii) Given a set $S = \{1, 3, 4, 5\}$ and $X = 8$. Find subset sum using backtracking problem. (6)

15. (a) Discuss NP completeness in Knapsack problem with justification. (16)

Or

(b) (i) Discuss the features of travelling salesman problem. (6)

(ii) Given a graph $G = (V, E, W)$ shown in the figure where vertices refer to cities, edges refer to connection between cities, weight associated with each edge represents the cost. Find out the minimum cost for the salesman. (10)

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