Code : 051506

B.Tech 5th Semester Exam., 2017

DESIGN AND ANALYSIS OF ALGORITHMS

Time : 3 hours   Full Marks : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

(ii) There are **NINE** questions in this paper.

(iii) Attempt **FIVE** questions in all.

(iv) Question No. **1** is compulsory.

1. Answer the following questions (any *seven*) :

2×7=14

   (a) What do you mean by an algorithm?

   (b) Define 0–1 knapsack problem.

   (c) Define Prim's Algorithm.

   (d) What is minimum spanning tree problem?

   (e) Define bipartite graph.

   (f) What is halting problem?

   (g) What is Euler tour?

   (h) What is single-source shortest path algorithm?

   (i) Define depth first search.

   (j) What is time complexity?

(**2**)

2. *(a)* Explain the different strategies used to measure resource consumption of an algorithm.

   (b) What is TSP? Write the pseudocode to solve TSP and analyze its efficiency.

7+7=14

3. *(a)* Analyze quick-sort algorithm with the help of recurrence relation.

   (b) Write the pseudocode of Prim's Algorithm.   7+7=14

4. *(a)* Explain the difference between dynamic and greedy programming approach.

   (b) Write the pseudocode for the 0–1 knapsack problem.   7+7=14

5. *(a)* What is divide and conquer strategy? Describe binary search algorithm.

   (b) Solve the given recurrence relations using master method :

   (i) $T(n) = 2T(n^{1/2}) + \lg n$

   (ii) $T(n) = 3T(n/4) + n\lg n$ 7+7=14

6. *(a)* Explain in detail the difference between BFS and DFS.

   (b) Write the pseudocode of DFS algorithm.

7+7=14

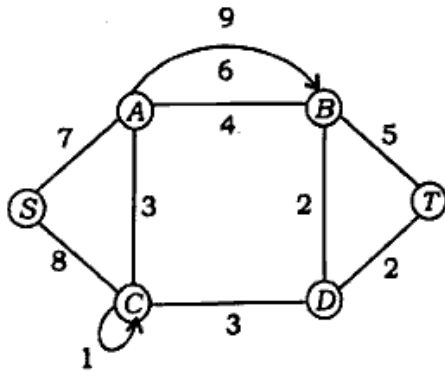**7.** (a) Show the steps of the DFS traversal using appropriate data structure for the graph shown below : 7
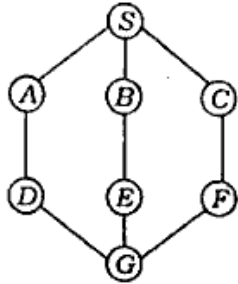
(b) Execute Kruskal's algorithm to find the minimum spanning tree of the following graph : 7

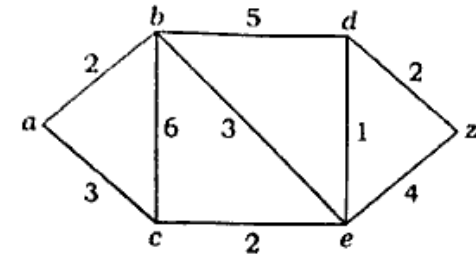**8.** (a) What is quick sort? Sort the following array using quick sort method : 7

54 26 93 17 77 31 44 55 20

(b) Apply Prim's Algorithm to find minimum spanning tree for the following graph : 7

9. Write short notes on the following : 7×2=14

(a) Amortized analysis

(b) Randomized algorithm

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