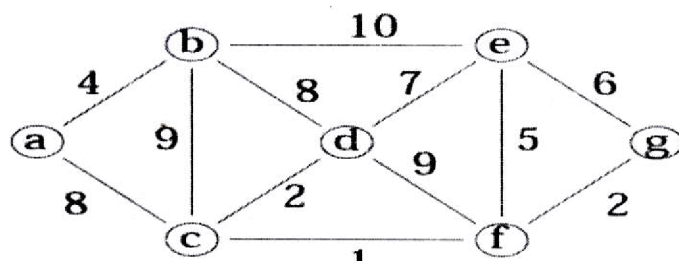


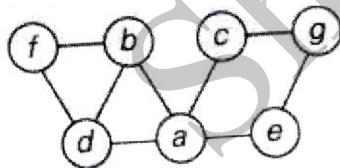
5. What do you mean by Minimum Spanning Tree ? List and explain the different methods of obtaining minimum spanning trees. Find the MST for the given graph using Prim's Algorithm. Assume 'a' is the starting vertex.

15



6. Compare and contrast DFS and BFS algorithm. Also write the BFS algorithm. In addition, traverse the below graph by using BFS algorithm. Start the traversal from vertex 'a' and resolve the ties by the vertex alphabetical order :

15



18D3

B. Tech. EXAMINATION, 2022

(Fourth Semester)

(C Scheme) (Main & Re-appear)

CSE

CSE206C

DESIGN AND ANALYSIS OF ALGORITHMS

Time : 3 Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. All questions carry equal marks.

Unit I

1. List and explain the characteristics of a good algorithm. Also write the mechanisms for analyzing the performance of an algorithm. **15**

2. (a) Illustrate the Master method for solving recurrence relations. Also solve the following recurrences by using Master method : **5**

$$(i) \quad T(n) = 16T\left(\frac{n}{4}\right) + n^2$$

$$(ii) \quad T(n) = 2T\left(\frac{n}{4}\right) + \sqrt{n}$$

(b) Solve the following recurrences by using recursion tree method : **10**

$$(i) \quad T(n) = T\left(\frac{n}{3}\right) + T\left(\frac{2n}{3}\right) + O(n)$$

$$(ii) \quad T(n) = 2T\left(\frac{n}{2}\right) + n^2.$$

Unit II

3. (a) List and explain the characteristics of dynamic programming. Also write how dynamic programming is different from greedy programming. **7**

(b) What is Bin Packing Problem ? Illustrate how Bin packing problem can be solved by using greedy programming. **8**

4. Given that the Knapsack capacity is 6 kg. Solve the following 0/1 Knapsack problem using the following techniques : (i) Greedy strategy and (ii) Branch and bound strategy. **15**

Item	Weight (kg)	Value (\$)
1	3	25
2	2	20
3	1	15
4	4	40
5	5	50

Unit IV

7. (a) Compare and contrast NP-complete and NP-hard classes of algorithms. 7
- (b) What are Randomized Algorithms ? Illustrate the significance of Randomized Algorithms. 8
8. (a) What are NP and P classes of problems ? Explain. 5
- (b) State and prove Cook's theorem. 10

Unit IV

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