A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 94C02

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2022

Fourth Semester

Computer Science and Business Systems

19UCB403 - Introduction To Design And Analysis Of Algorithms

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which is the formal way to express the upper bound of an algorithm's running time. CO1- U

   (a) Big Oh Notation (b) Omega Notation (c) Theta Notation (d) None of the above

2. In a flowchart, an input or output instruction is represented by _____ CO1- R

   (a) A diamond (b) Rectangle (c) Parallelogram (d) A circle

3. The approach of dynamic programming is similar to CO1- R

   (a) Parsing (b) Hash table

   (c) Divide and Conquer algorithm (d) Greedy algorithm

4. What is the time complexity of the brute force algorithm used to solve the Knapsack problem CO1- R

   (a) O(n) (b)O(n!) (c)O(2n) (d) O(n2)

5. Which of the following methods can be used to solve the Knapsack problem CO1- R

   (a) Brute force algorithm (b)Recursion

   (c) Dynamic Programming (d) Brute force, Recursion and Dynamic Programming

6. The Knapsack problem is an example of _____ CO1- R

   (a) Divide and conquer algorithm (b) Greedy algorithm

   (c)1D Dynamic Programming (d) 2D Dynamic Programming

7. In simplex method, the feasible basic solution must satisfy the CO1- R

(a) non negativity constraint (b) Negativity constraint

(c) Basic constraint (d) Common constraint

8. How many constraints does flow have? CO1- R

(a) One (b) Two (c) Three (d) Four

9. Which of the problems cannot be solved by backtracking method? CO3- Ana

(a) n-queen problem (b) subset sum problem

(c) Hamiltonian circuit problem (d) travelling salesman problem

10. Branch and bound is a _____ CO1- U

(a) problem solving technique (b) data structure

(c) sorting algorithm (d) type of tree

PART – B (5 x 2= 10 Marks)

11. Define Big Omega Notations. CO1- U

12. Define brute force method CO1- U

13. Differentiate prim's Algorithm and Kruskal's Algorithm CO2- App

14. Define Stable Marriage Problem CO1- R

15. What are the additional items required for branch and bound? compare backtracking technique CO3- Ana

PART – C (5 x 16= 80 Marks)

16. (a) (i) Discuss important problem types that you face during Algorithm Analysis. CO2- App (8)

(ii) Write short note on Fundamentals of Algorithmic Problem Solving CO2- App (8)

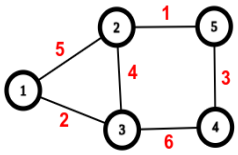
Or

(b) Illustrate briefly on Big oh Notation, Omega Notation and Theta Notations. Depict the same graphically and explain. CO2- App (16)

17. (a) Explain in detail quick sorting method. Provide a complete analysis of quick sort with example. CO3- Ana (16)

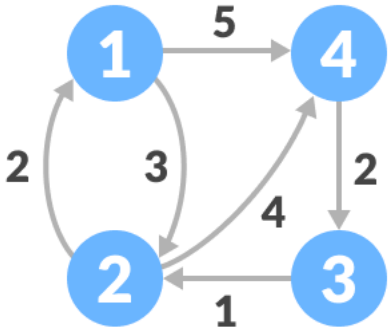
Or

	(b)	Explain how the merge sort can be viewed as a recursive application of the Divide and conquer methodology. Suggest a pseudo code for merge sort and analyze its complexities. Trace its application to the following data set 9,4,3,8,6,2,1,5,7.	CO3- Ana	(16)
18.	(a)	Using Prim's algorithm, determine minimum cost spanning tree for the weighted graph shown below.	CO4- Ana	(16)



Or

	(b)	Using Floyd Warshall Algorithm, find the shortest path distance between every pair of vertices.	CO4- Ana	(16)



19.	(a)	Explain geometric interpretation of Linear programming with example	CO1- U	(16)

Or

	(b)	What is bipartite graph? Outline with example	CO1- U	(16)
20.	(a)	Explain the traveling salesman problem using branch & bound and backtracking.	CO1- U	(16)

Or

	(b)	Explain elaborately on backtracking algorithm.	CO1- U	(16)