Reg. No : | | | | | | | | | | | | |

Question Paper Code:U5D01

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Fifth Semester

Computer Science and Business Systems

21UCB501 DESIGN AND ANALYSIS OF ALGORITHM

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

PART A - (10 x 2 = 20 Marks)

1.	Define the term Algorithm.	CO1- U
2.	Find GCD (31415, 14142) by applying Euclid's algorithm.	CO2- App
3.	14,33,26,11,8. Sort the given elements using Merge Sort Algorithm.	CO2- App
4.	Write the time complexities of Bubble sort and Selection Sort.	CO1- U
5.	Find an optimal Huffman Code for the following set of frequencies: a: 50 b: 25 c: 15	CO2- App
6.	Define dynamic programming with an example.	CO1- U
7.	How do you identify a bounded node in a Subset Sum Problem?	CO2- App
8.	Compare Backtracking and Branch& Bound algorithm with an example	CO1- U
9.	Define the terms Clique and Vertex Cover.	CO1- U
10.	What is meant by NP hard and NP complete?	CO1- U

PART – B (5 x 16= 80 Marks)

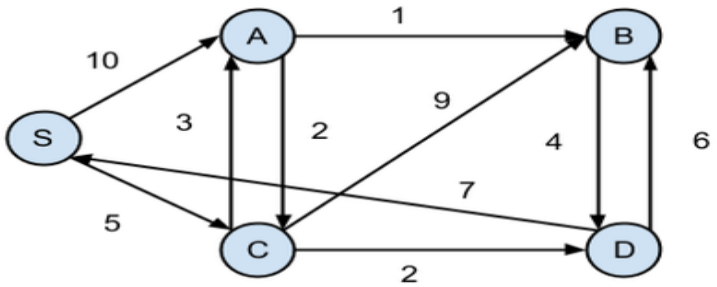
11.	(a)	Design an algorithm to find all the common elements in two sorted lists of numbers. For example, for the lists 2, 5, 5, 5 and 2, 2, 3, 5, 5, 7, the output should be 2, 5, 5.What is the maximum number of comparisons your algorithm makes if the lengths of the two given lists are m and n, respectively?	CO2- App	(16)
		Or		
	(b)	Discuss in detail about the calculation of time efficiency for the algorithm to place the largest to smallest disc in a Tower C, provided that Tower A and Tower B with 3 disc s and 2 discs respectively.	CO2- App	(16)

12. (a) 40,55,63,17,22,68,89,97,72 Sort the elements using Merge Sort and Quick Sort and analyze which one provides the optimal solution. CO2- App (16)

Or

(b) Write an algorithm to sort the list 8,3,2,9,7,1,5,4 using Merge Sort and also analyze the efficiency of this algorithm CO2- App (16)

13. (a) Write an algorithm to find the shortest path using Dijkstras algorithm CO2- App (16)



Or

(b) Construct an Optimal Binary Search tree for the given list of number 25,28,36,10,12,5,22,30,40,28,38,48. CO2- App (16)

14. (a) Write down the Backtracking Algorithm to implement the backtracking for the better solution to place 8 queens in a 8*8 board CO1- U (16)

Or

(b) Write down the algorithm for backtracking to place 16 queens in a 16*16 matrix board and find atleast 3 solutions to place the queens. CO1- U (16)

15. (a) Explain the different types of Complexity Classes with an example CO1- U (16)

Or

(b) Explain in detail about the P, NP, NP complete and NP hard classes with a diagram. CO1- U (16)