21/01/2023

Reg. No.													

Question Paper Code	11659

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Fourth Semester

Information Technology

(Common to Computer Science and Engineering and Artificial Intelligence and Data Science)

20ITPC401 - DESIGN AND ANALYSIS OF ALGORITHMS

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	What is an algorithm? Why is it essential for problem solving?	2,K1,CO1
2.	Define theta and Big O notation.	2,K1,CO2
3.	State the characteristics of Divide and conquer approach.	2,K1,CO1
4.	Write how string matching can be done with brute force method.	2,K1,CO4
5.	Write the principle of optimality.	2,K1,CO3
6.	State the purpose of Huffman trees.	2,K1,CO6
7.	What is meant by iterative improvement in algorithms? Give example.	2,K1,CO4
8.	Write down the purpose of simplex method with examples.	2,K1,CO1
9.	Define NP class problem. Give examples.	2,K1,CO5
10.	What is the difference between LIFO and FIFO search? Give their applications.	2,K1,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

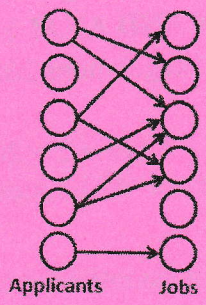
11.	a)	(i) Explain any four algorithmic techniques with suitable examples.	10,K2,CO2
		(ii) Present the necessity of asymptotic notations and their properties.	3,K2,CO2
		OR	
	b)	Write the recurrence relation of any recursive algorithm and derive the efficiency by solving the recurrence relation.	13,K2,CO2
12.	a)	Demonstrate how closest pair in a set of 10 items is found with brute force approach.	13,K2,CO4
		OR	
	b)	(i) Write the Quick sort algorithm and apply it to sort 10 integers of your choice.	10,K2,CO4
		(ii) Write how does the algorithm falls under Divide and conquer.	3,K2,CO4

13. a) With any given weighted graph of 8 vertices and 12 edges, demonstrate Prim's algorithm to find the minimum spanning tree *13,K2,CO3*

OR

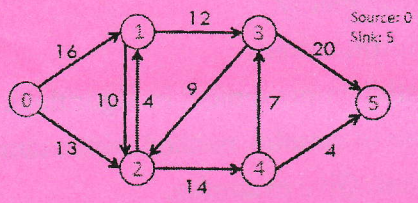
b) Present in detail how coin change problem is approached with dynamic programming. Have at least 6 coins of different denominations. *13,K2,CO3*

14. a) Given a bipartite graph of applicants and jobs, present the maximum matching algorithm to find the maximum matching solution for the same. *13,K3,CO6*



OR

b) Write and demonstrate maximum flow algorithm with the given flow graph. *13,K3,CO6*



15. a) Demonstrate the 8-Queen problem and report the class of the problem as P/NP/NP -complete/NP-Hard with suitable justification. *13,K2,CO5*

OR

b) Illustrate Branch and bound algorithmic technique with Travelling salesman problem. Assume your own example data. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Illustrate the dynamic programming solution for solving the given knapsack problem. Analyze the improvement in terms of memory functions. *15,K3,CO3*

Item	1	2	3	4
Weight	5	10	4	2
Value	20	30	20	10
Bag weight = 15				

OR

b) Present the Kruskal's algorithm and apply the same in the given graph to find minimum spanning tree. Also analyze the efficiency of the algorithm. *15,K3,CO3*