Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Winter Examination-2021

Subject Name: Design and Analysis of Algorithms

Subject Code: 4TE05DAA1 **Branch: B.Tech (CE)**

Semester: 5 **Date: 20/12/2021** **Time: 11:00 To 02:00** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) Define time complexity of algorithm. (01)
b) Write the complexity of selection sort and binary search. (01)
c) Explain equivalence relation. (01)
d) Define: Spanning Tree (01)
e) Define: Depth First Search (01)
f) Define: Directed acyclic graph. (01)
g) When is a problem said to be NP-Hard? (01)
h) Arrange following rate of growth in increasing order: (01)
2N, nlogn, n2,1, n, logn, n!, n3
i) Define Big 'Oh' notation. (01)
j) What is the difference between recursion and iteration? (01)
k) What are the characteristics of an algorithm? (01)
l) Which condition needs to be fulfilled for binary search? (01)
m) Name any two graph algorithm. (01)
n) What is the time complexity to insert an element in sorted array? (01)

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions**

(a) What is Asymptotic notation? Explain upper bound notation, lower bound notation and tight bound notation. **(7)**

(b) Solve following recurrences. **(7)**

1. T(n)=4T(n/2)+n
2. T(n)=2T(n/2)+n

Q-3 **Attempt all questions**

(a) Differentiate: Divide and conquer strategy, Greedy algorithms and dynamic programming strategy **(7)**

	(b)	Solve the following 0/1 knapsack problem with knapsack capacity=8. I= (I1, I2, I3, I4) V= (15,10,9,5) W=(1,5,3,4)	**(7)**
Q-4		**Attempt all questions**	
	(a)	Analyze Merge sort. Write its algorithm and derive its complexity.	**(7)**
	(b)	Explain Dijkstra's shortest path algorithm.	**(7)**
Q-5		**Attempt all questions**	
	(a)	Find Longest Common Subsequence of given two strings using Dynamic programming strategy. S1=zxcvcvbcv S2=zxccxvbvn	**(7)**
	(b)	Explain prim's minimum spanning tree algorithm with an example.	**(7)**
Q-6		**Attempt all questions**	
	(a)	Solve the following matrix chain multiplication problem in optimal way. M1: 5 x 4, M2: 4 x 6, M3: 6 x 2, M4: 2 x 7	**(7)**
	(b)	Explain the 8 queen problem with example.	**(7)**
Q-7		**Attempt all questions**	
	(a)	Explain Naive String matching algorithm.	**(7)**
	(b)	Explain Floyd Warshall algorithm with example.	**(7)**
Q-8		**Attempt all questions**	
	(a)	Explain P type and NP type of problems.	**(7)**
	(b)	What is relation? Explain types of relation with example.	**(7)**