SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code: BCS-503 **Subject: DESIGN & ANALYSIS OF ALGORITHM**

Course: B.Tech. **Semester: 5th**

SECOND SESSIONAL EXAMINATION, ODD SEMESTER, (2024-2025)

Branch: Computer Science & Engineering

Time–2hr **MaximumMarks–45**

NOTE:(Attempt all sections)

1. **Attempt any FIVE questions.**

QN	QUESTION	Marks	CO	BL
a	Explain binary search tree?	2	CO2	L2
b	Define fractional Knap-sack problem?	2	CO1	L1
c	Discuss Skip list and its operations?	2	CO2	L2
d	Illustrate the applications of Graph Coloring Problem?	2	CO4	L4
e	What do you mean by activity selection problem?	2	CO4	L4
f	Define principle of optimality?	2	CO4	L4

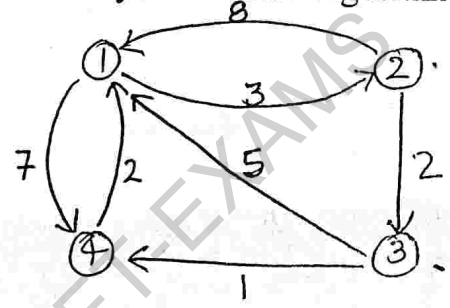
2. **Attempt any *ONE* of the following.**

QN	QUESTION	Marks	CO	BL
a	Explain and Write the Naïve-String string matching algorithm: Suppose the given pattern p= a a b and given text T = a c a a b c. Apply Naïve-String Matching algorithm on above Pattern (P) and Text (T) to find the number of occurrences of P in T?	5	CO4	L4
b	Explain algorithm for counting sort. Illustrate the operation of counting sort on the following array: A={0,1,3,0,3,2,4,5,2,4,6,2,2,3}?	5	CO3	L3
c	Explain and write an algorithm for union of two binomial heaps and write its time complexity?	5	CO2	L2

3. Attempt any FIVE questions.

QN	QUESTION	Marks	CO	BL
a	Illustrate n queen's problem. Draw a state space tree for 4 queen problem using backtracking.	2	CO4	L4
b	Differentiate Backtracking and Branch and Bound Techniques	2	CO3	L3
c	Discuss the properties of binomial trees.	2	CO2	L2
d	Explain Randomized algorithms.	2	CO2	L2
e	Describe TSP? Show that a TSP can be solved using backtracking method.	2	CO3	L3
f	Write an algorithm of Naïve Matching and implement it by any example.	2	CO4	L4

4. Attempt any *ONE* of the following.

QN	QUESTION	Marks	CO	BL
a	Determine an LCS of X={A,B,C,B,D,A,B} and Y={B,D,C,A,B,A}	5	CO5	L5
b	Explain the Floyd Warshall algorithm with an example. 	5	CO5	L5
c	What is sum of subset problem? Draw a state space tree for Sum of subset problem using backtracking? Let n=6, m=30, and w [1:6] = {5, 10, 12, 13, 15, 18}.	5	CO5	L5

5. Attempt any FIVE questions.

QN	QUESTION	Marks	CO	BL
a	What do you mean by Convex hull?	2	CO4	L4
b	Explain NP – Complete NP- Hard?	2	CO3	L3
c	Write down the properties of Fibonacci Heap?	2	CO2	L2
d	What is Huffman Code, explain application of Huffman code?	2	CO2	L2
e	Explain difference between BFS and DFS?	2	CO3	L3

f	What is Job Sequencing Problem with deadline?	2	CO4	L4

6. **Attempt any *ONE* of the following.**

QN	QUESTION	Marks	CO	BL
a	Explain "greedy algorithm" Write its pseudo code to prove that fractional Knapsack problem has a greedy-choice property?	5	CO5	L5
b	Define P, NP, NP Hard and NP Complete classes with example?	5	CO5	L5
c	What is Stable sorting Algorithms? Which of the sorting Algorithm we have seen stable and which are unstable?	5	CO5	L5

All the best

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