

Name: _____		Printed Pages:01		
Student Admn. No.: _____				
<p>School of Computing Science of Engineering</p> <p>Backlog Examination, June 2023</p> <p>[Programme: BCA] [Semester: IV] [Batch:]</p>				
Course Title: Introduction to Algorithm Design		Max Marks: 100		
Course Code: BCAC2204		Time: 3 Hrs.		
Instructions:	<p>1. All questions are compulsory.</p> <p>2. Assume missing data suitably, if any.</p>			
		K Level	COs	Marks
SECTION-A (15 Marks)		5 Marks each		
1.	Define a recurrence relation. Draw a recurrence tree for the following recurrence relation $T(n) = 2T(n/2) + 1$	K1	CO1	5
2.	Apply the Merge sort algorithm to sort the following :15, 4, 3, 10, 8, 7, 13, 6 Also write the time complexity of merge sort in worst case	K1	CO1	5
3.	Create a Red Black tree given input 2, 1, 4, 5, 9, 3, 6, 7.	K2	CO2	5
SECTION-B (40 Marks)		10 Marks each		
4.	Devise an algorithm to insert a node in a Binary Search Tree.	K2	CO2	10
5.	Solve the following 0/1 Knapsack Problem using Dynamic Programming. Weights: {3, 4, 6, 5}, Profits: {2, 3, 1, 4} The weight of the knapsack is 8 kg	K3	CO3	10
6.	Give a linear time algorithm for fractional knapsack problem?	K3	CO3	10
7.	<p>Explain the following graph traversal</p> <p>(i) Depth First search</p> <p>(ii) Breath First search</p> <p style="text-align: center;">(OR)</p> <p>How do you construct a minimum Spanning tree using Kruskal's algorithm explain? List any two applications</p>	K4	CO4	10
SECTION-C (45 Marks)		15 Marks each		
8.	Explain Dijkstra's Algorithm in detail with example and analyze its efficiency	K4	CO4	15
9.	Explain the chained matrix multiplication with suitable example.	K5	CO5	15
10	<p>Discuss in detail about the class P, NP, NP-hard and NP-complete problems. Give examples for each class.</p> <p style="text-align: center;">(OR)</p> <p>Compare and contrast between connected components and bi connected components.</p>	K5	CO5	15