

School of Computing Science and Engineering

Department of Computer Application

Mid Term Examination

Exam Date: 27 Sep 2023

Time : 90 Minutes

Marks : 50

Sem V - E1UA502B - Algorithm analysis and Design

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

- 1) Distinguish between worst-case and average-case time complexities. K2 (2)
- 2) Define a red-black tree and explain its key properties. K1 (3)
- 3) Describe the process of "Greedy" algorithm design. K2 (4)
- 4) Explain how merge sort works with a suitable example . K2 (8)
- 5) Implement linear search algorithm. K3 (6)
- 6) Using the bubble sort algorithm, sort the values [0.,5, 1, 6, 15, 17,20]. Show all steps. K3 (9)
- 7) Analyze the time complexity the algorithm to find the factorial of a number using recursion. K4 (8)
- 8) Prove that any comparison-based sorting algorithm has a best-case time complexity of $O(n \log n)$. K4 (12)

OR

Prove the correctness of quicksort algorithm's partitioning step. K4 (12)