SDM COLLEGE OF ENGINEERING & TECHNOLOGY, DHARWAD

Department of Computer Science and Engineering

Internal Assessment - 1

Course. Title & Code : Analysis and Design of Algorithms (22UCSC400)
Semester : IV (A & B) Date : 24-04-2024.
Max. Marks : 20 Duration : 1 Hr.
Course Teachers : Prof. Anand. D. Vaidya.& Prof. S.G.Yadawad

Note: 1. Answer any one question from **Q1** and **Q2**. **Q3 is compulsory.**
2. Write programs using modular approach.

Q.No.1.a) Explain asymptotic notations. Give an example for each. **[Marks:4, CO1]**

b) Write an algorithm to sort the elements of the array using merge sort algorithm. Analyze the time complexity of the algorithm. **[Marks:4,+2=6 CO1,2]**

Q.No.2. a) Write an algorithm to search for a pattern in a text. Analyze the time complexity of the algorithm. **[Marks:3+1=4, CO1]**

b) Write an algorithm to sort the elements of the array using quick sort algorithm. Analyze the time complexity of the algorithm. **[Marks:4+2=6, CO1,2]**

Q.No.3.a) Consider the following recursive algorithm. **[Marks:2+2=4, CO1]**

ALGORITHM *Riddle*($A[0..n-1]$)
//Input: An array $A[0..n-1]$ of real numbers
if $n = 1$ return $A[0]$
else *temp*←*Riddle*($A[0..n-2]$)
if *temp* $\leq A[n-1]$ return *temp*
else return $A[n-1]$

i. What does this algorithm compute?
ii. Set up a recurrence relation for the algorithm's basic operation and solve it.

b) Write selection sort algorithm. Write the time complexity of the algorithm. Demonstrate its working on the following set of numbers: **[Marks:3+1+2=6, CO2]**

29 24 15 78 45 37.