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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023**

Semester : Semester IV - 2021

Course Code : CSE2007

Course Name : Sem IV - CSE2007 - Design and Analysis of Algorithms

Program : B.Tech - (All Programs)

Date : 12-APR-2023

Time : 2PM - 3.30PM

Max Marks : 50

Weightage : 25%

Instructions:

- (i) Read all questions carefully and answer accordingly.
 - (ii) Question paper consists of 3 parts.
 - (iii) Scientific and non-programmable calculator are permitted.
 - (iv) Do not write any information on the question paper other than Roll Number.
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PART A

ANSWER ALL THE QUESTIONS

(5 X 2 = 10M)

1. What is Analysis of Algorithm? Write the different ways to find the efficiency of an algorithm.
(CO1) [Knowledge]
2. What is Order of Growth. Write its basic efficiency classes.
(CO1) [Knowledge]
3. Name the algorithm design techniques to solve the following problem.
(i) Insertion Sort
(ii) Mergesort
(CO1) [Knowledge]
4. Obtain recurrence relation for the Factorial of a number using Recursive Algorithm
(CO1) [Knowledge]
5. Define Master's Theorem.
(CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(4 X 5 = 20M)

6. Explain the different asymptotic notations with graph. Give an example for each.
(CO1) [Comprehension]

7. Apply Strassen's matrix multiplication algorithm for the given 2×2 matrix and obtain the resultant matrix.
A = [5, 6 : 7, 8]
B = [1, 4 : 4, 5]
- (CO2) [Comprehension]
8. Arrange the given elements in the ascending order using Insertion Sort. Show each step
23, 1, 10, 5, 2
- (CO2) [Comprehension]
9. Ram is solving a Problem where he needs to find a given key in an unsorted array of n numbers in order of n time. Help Ram to write such an algorithm.
- (CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 10 = 20M)

10. Write the algorithm for merge sort and derive its time complexity using backward substitution method.
- (CO2) [Application]
11. Apply Quick Sort to sort the given list in ascending order and derive its time complexity for best case using backward substitution method
5, 3, 8, 6, 4, 7, 3, 1
- (CO2) [Application]