

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular End Semester Examination – Summer 2022**

**Branch : Computer Engineering/ CSE/ CSE(AI&ML)**

**Course: S.Y B. Tech.**

**Semester :IV**

**Subject Code & Name: BTCOC401 (Design and Analysis of Algorithm)**

**Max Marks: 60**

**Date: 12/08/2022**

**Duration: 3.45 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q. 1 Solve Any Two of the following**

- |                                                                  |            |   |
|------------------------------------------------------------------|------------|---|
| A) Define Algorithm? State the main characteristics of Algorithm | Knowledge  | 6 |
| B) Describe Asymptotic notations with expression                 | Understand | 6 |
| C) Evaluate $9T(n/3) + n$                                        | Evaluation | 6 |

**Q.2 Solve Any Two of the following.**

- |                                                                                                                                                                                |            |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---|
| A) Describe an algorithm for Merge Sort and find its time complexity                                                                                                           | Understand | 6 |
| B) Evaluate and write the algorithm for Quick sort describe its best and worst case with suitable example                                                                      | Evaluation | 6 |
| C) $\begin{bmatrix} 6 & 7 \\ 5 & 4 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ Solve using Strassen's Matrix Multiplication, and Calculate its time complexity | Analysis   | 6 |

**Q. 3 Solve Any Two of the following.**

- |                                                                              |            |   |
|------------------------------------------------------------------------------|------------|---|
| A) Draw a state space tree for finding four queens solutions                 | Understand | 6 |
| B) Apply branch and bound technique to solve travelling salesman problem for | Analysis   | 6 |

$\infty$	20	30	10	11
15	$\infty$	16	4	2
3	5	$\infty$	2	4
19	6	18	$\infty$	3
16	4	7	16	$\infty$

the graph whose matrix is

- |                                                          |            |   |
|----------------------------------------------------------|------------|---|
| C) Describe Graph Coloring Problem with suitable example | Understand | 6 |
|----------------------------------------------------------|------------|---|

**Q.4 Solve Any Two of the following.**

- |                                                                                                                                                              |          |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|
| A) Solve the Fractional Knapsack problem Given $n = 5$ objects and a knapsack capacity $W = 60$ profit = (30, 20, 100, 90, 160) Weight = (5, 10, 20, 30, 40) | Analysis | 6 |
| B) Solve an optimal Huffman code for the following set of frequencies<br>a: 50 b: 25 c: 15 d: 40 e: 75                                                       | Analysis | 6 |
| C) Solve Job sequencing with deadlines $n=4$ , $p=(100, 10, 15, 27)$ and $d=(2, 1, 2, 1)$ find optimal solution                                              | Analysis | 6 |

**Q. 5 Solve Any Two of the following.**

- A) Calculate the shortest path by using Floyd's Warshall Algorithm

Application **6**

0	4	5
2	0	$\infty$
$\infty$	-3	0

- B) Calculate the longest common subsequence for  $X=\{A,B,C,B,D,A,B\}$

Application **6**

$Y=\{B,D,C,A,B,A\}$

- C) Differentiate between Dynamic Programming and greedy Approach

Analysis **6**

**\*\*\* End \*\*\***