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 the graph whose matrix is $\begin{matrix}\infty & 20 & 30 & 10 & 11\\15 & \infty & 16 & 4 & 2\\3 & 5 & \infty & 2 & 4\\19 & 6 & 18 & \infty & 3\\16 & 4 & 7 & 16 & \infty\end{matrix}$	Analysis	**6**
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 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**

$$\begin{matrix} 0 & 4 & 5 \\ 2 & 0 & \infty \\ \infty & -3 & 0 \end{matrix}$$

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 *****