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	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	**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

For Q.3 B) the matrix is:

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

For Q.4 B) the set of frequencies:

a: 50   b: 25   c: 15 d: 40 e=75

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 ***