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DEPARTMENT OF INFORMATION TECHNOLOGY

CONTINUOUS ASSESSMENT TEST -II

Subject Name: Design & analysis of algorithms **Duration: 1Hr 30 mins**
Subject Code: CS8451 **Date: 28.04.2021**
Branch/ Year/Sem: IT / II /IV **Max.Marks:50**

PART –A **(5*2=10)**

I. ANSWER ALL QUESTIONS

1. Differentiate between divide and conquer and dynamic programming [CO4],[K4]
2. Give the recurrence relation for knapsack problem. [CO4],[K4]
3. Define the terms: class P & NP problems. [CO5], [K 4]
4. Define Multistage graph. [CO6], [K3]
5. Write the greedy algorithm for container loading problem . [CO6], [K3]

PART B **(2*13=26)**

II. ANSWER ALL QUESTIONS

6. a. Construct Optimal Binary Search Tree for the following key set ={do, if, int, while} with following probabilities (0.1,0.2,0.4,0.3). (13)[CO4], [K4]

[OR]

b. Explain closest-pair and convex-hull problems by Divide and Conquer . (13) [CO4],[K4]

7. a. Explain the approximation algorithms for the knapsack problem with sample instance. (13) [CO5], [K4]

[OR]

b. Explain the approximation algorithms for the Traveling Salesman problem with sample instance. (13) [CO5], [K4]

PART C (1*14=14)

8. a. i. Construct a Huffman tree for the following data and obtain its Huffman code (14) [CO6],[K3]

Character	A	B	C	D	E	-
Probability	0.5	0.35	0.5	0.1	0.4	0.2

ii) Encode the text DAD-BE using the code of question (i.)

iii) Decode the text whose encoding is 1100110 in the code of question (i.)

iv) Calculate the expected number of bits per character

[OR]

b. Solve the all pair shortest path for the digraph with the following weight matrix and write its algorithm. (14) [CO6] ,[K3]

$$\begin{pmatrix} 0 & 2 & \infty & 1 & 8 \\ 6 & 0 & 3 & 2 & \infty \\ \infty & \infty & 0 & 4 & \infty \\ \infty & \infty & 2 & 0 & 3 \\ 3 & \infty & \infty & \infty & 0 \end{pmatrix}$$

Course Outcomes	CS8451 Design and Analysis of Algorithms
CO1	Review the fundamentals of algorithmic problem solving and analysing efficiency of algorithms.
CO2	Apply mathematical formulation, complexity analysis and methodologies to solve recurrence relations for algorithms
CO3	Compare the time complexities of various algorithms
CO4	Critically analyse the different algorithm design techniques for a given problem
CO5	Illustrate NP class problems and formulate solutions using standard approach
CO6	Articulate solutions for real life problems using algorithm design principles