



CONTINUOUS ASSESSMENT TEST- 3

DEPARTMENT OF CSE & IT

Course Name: Design and Analysis of Algorithm

Course Code: CS8451

Branch: CSE & IT

Year / Sem : II / IV

Duration: 3 hours

Date: 26/06/21

Max.Marks: 100

PART-A (10 x 2= 20)

Answer all the Questions.

1. Define Algorithm. List the desirable properties of algorithm.[CO1,K2]
2. What are the fundamental steps in Algorithmic Problem Solving? [CO1,K2]
3. Solve the recurrence equation $T(n)=T(n-1)+n$. [CO2,K3]
4. How do you measure an algorithm's running time? [CO2,K3]
5. Compare Prim's and Kruskal's Algorithm.[CO3,K4]
6. Analyse the time complexity of Binomial Coefficient.[CO3,K4]
7. When do you say a graph is a complete bi-partite graph?[CO6,K3]
8. List the advantages of Huffman encoding .[CO6,K3]
9. Define NP-Hard and NP-Complete problem.[CO5,K4]
10. Differentiate Branch & Bound and Backtracking Method. .[CO4,K4]

PART-B(5x13 = 65)

Answer all the Questions.

- 11.(a) Explain the recursive and non- recursive versions of the factorial function. Examine how much time each function requires as 'n' becomes large. (13) [CO2,K3]
(or)
(b) Explain the asymptotic Notations and their properties.Illustrate with examples.(13)[CO2,K3]
- 12.(a) Analyze and infer the method suitable for performing multiplication of two large integers. Explain how divide and conquer method can be used to solve the same.(13) [CO3,K4]
(or)
(b) Illustrate how quick sort algorithm is applied to the given numbers 5,3,1,9,8,2,4,7 and analyze its time complexity (13) [CO3,K4]
- 13.(a) Explain the memory function method for the knapsack problem and give the algorithm. (13) [CO4-K4]

(or)

(b) Analyze and infer the solution for the following Assignment problem using Branch and Bound technique. (13) [CO4-K4]

$$\begin{pmatrix} 9 & 2 & 7 & 8 \\ 6 & 4 & 3 & 7 \\ 5 & 8 & 1 & 8 \\ 7 & 6 & 9 & 4 \end{pmatrix}$$

14.(a) (i) Interpret stable marriage problem. Explain the algorithm and examine . (7) [CO6,K3]
(ii) Solve 8-queen's problem using Backtracking. (6) [CO6,K3]

(or)

(b) Apply the Simplex method to the linear programming problem.

Maximize $Z = 3x + 5y$ Subject to $x + y \leq 4$, $x + 3y \leq 6$; $x, y \geq 0$ (13)
[CO6][K3]

15.(a) Illustrate with suitable examples the approximation algorithm for Knapsack problem (13)
[CO5,K4]

(or)

(b) Explain approximation algorithm for Travelling salesman problem (13) [CO5,K4]

PART-C(1x15 = 15)

16.(a) Infer the Optimal solution using Exhaustive search for the following assignment problem. (15)
[CO1,K2]

	Job1	Job2	Job3	Job4
A	9	2	7	8
B	6	4	3	7
C	5	8	1	8
D	7	6	9	4

(OR)

(b) Interpret Brute force approach and Solve the following instance of knapsack problem. (15)
[CO1,K2]

W=15

Item	Weight	Gain
1	5	\$40
2	7	\$35
3	2	\$18
4	4	\$4
5	5	\$10
6	1	\$2