



DEPARTMENT OF INFORMATION TECHNOLOGY

CONTINUOUS ASSESSMENT TEST -I

Subject Name: Design & analysis of algorithms

Duration: 1Hr 30 mins

Subject Code: CS8451

Date: 27.03.2021

Branch/ Year/Sem: IT / II /IV

Max.Marks:50

PART -A

(5*2=10)

I. ANSWER ALL QUESTIONS

1. Solve the recurrence relation: $T(n) = 2T(n/2) + n$ [CO2],[K3]
2. What are the basic asymptotic efficiency classes [CO2],[K3]
3. Differentiate parallel and sequential algorithm. [CO1], [K2]
4. What are the fundamental steps involved in algorithmic problem solving? [CO1], [K2]
5. Deduce the general divide and conquer recurrence. [CO3], [K4]

PART B

(2*13=26)

II. ANSWER ALL QUESTIONS

6. a. Apply the general plan of recursive algorithm for analysing the time complexity of Tower of Hanoi problem (13) [CO2], [K3]

[OR]

- b. Apply the general plan for analysing the time complexity of any two non - recursive algorithm (13) [CO2], [K3]

7. a. Explain the Merge sort algorithm and analyse its time efficiency. (13) [CO3], [K4]

[OR]

- b. Explain the binary search algorithm and analyse the worst-case time complexity. (13) [CO3], [K4]

PART C**(1*14=14)**

8. a. i. Explain knapsack problem and find the optimal solution for the following instance with capacity $W=8$ (7) [CO1], [K2]

i	w_i	v_i
1	2	1
2	3	2
3	4	8
4	5	6

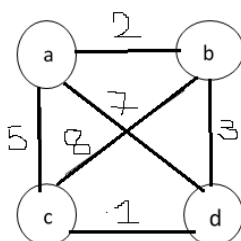
- ii. Explain the closest pair problem. (7) [CO1], [K2]

[OR]

- b. i. Explain the Assignment problem and find the optimal solution for the following instance (8) [CO1], [K2]

Job/person	J_1	J_2	J_3	J_4
P1	10	3	8	9
P2	7	5	4	8
P3	6	9	2	9
P4	8	7	10	5

- ii. Find the shortest Hamiltonian circuit. (6) [CO1], [K2]



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