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Bengaluru

Mid Term Examinations - October 2026

Date: 05/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: CSA2505 **Course Name:** Analysis of Algorithms

Semester: Third Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3
Marks	88	44	48

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Define an algorithm. List any two characteristics of a good algorithm.	2	CO1	BT1
2	Differentiate between best-case and worst-case complexity.	2	CO1	BT2
3	What is the best-case time complexity of optimized Bubble Sort?	2	CO3	BT2
4	Explain what is meant by an optimal solution in the context of algorithms.	2	CO2	BT2
5	In an array of 10 elements, how many comparisons may be required in the worst case using Sequential Search?	2	CO3	BT3

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Explain the following asymptotic notations • Big-Oh • Big-Omega • Big-Theta	10	CO1	BT2
7	Describe the standard recursive algorithm for factorial and explain how its time complexity is obtained using mathematical analysis of recursive methods.	10	CO1	BT2

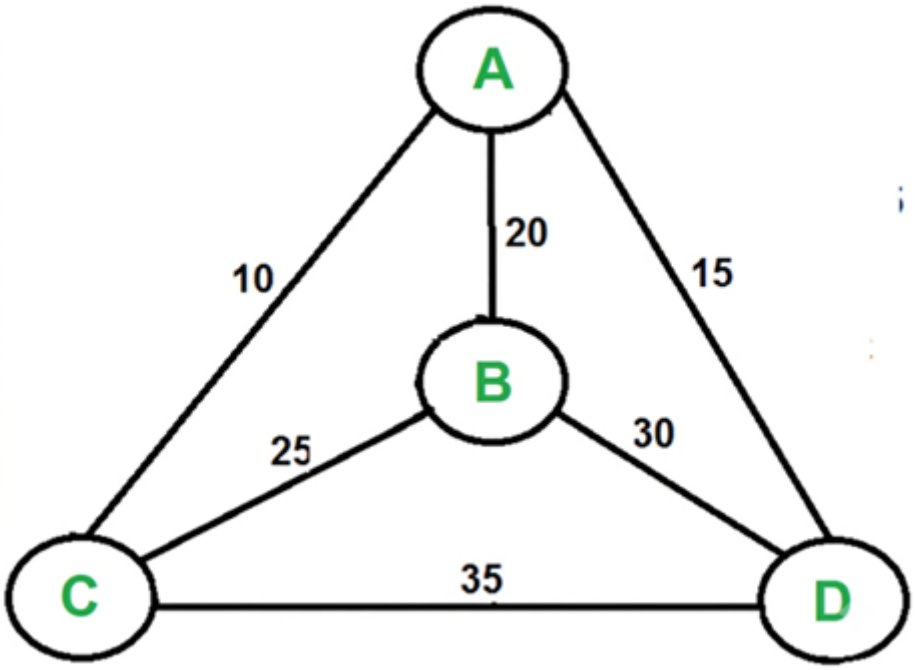
PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	Construct recursive algorithm for the Tower of Hanoi problem. Formulate the recurrence relation for the algorithm and explain how its time complexity is obtained using mathematical analysis.	10	CO1	BT3
9	A teacher has recorded the marks of n students in an array and wants to identify the highest mark scored in the class. Explain the non-recursive approach used to find the maximum element in an array and write the corresponding algorithm. Illustrate the working of the algorithm using the following set of marks: [78,92,65,88,95,72]	10	CO1	BT3

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT

10	Apply the Selection Sort technique to arrange the elements in ascending order. Show the array after each pass and write the algorithm used. Also state the time complexity of Selection Sort. [64, 25, 12, 22, 11]	10	CO3	BT3
11	A college has assigned a unique registration number to each student in a class. Before finalizing the student database, the administrator wants to check whether any registration number has been entered more than once. The registration numbers are: [1025, 1042, 1018, 1035, 1042, 1060] Illustrate an algorithm using the brute-force technique to check whether all elements in the array are unique, and trace the algorithm for the given input until a duplicate element is identified.	10	CO3	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	Explain the Travelling Salesman Problem (TSP) and describe the brute-force approach for finding the minimum-cost tour for the given weighted graph of cities A, B, C, and D, starting and ending at A.  	10	CO2	BT3
13	Explain the 0/1 Knapsack problem and describe how the brute-force technique can be used to determine the maximum profit for a given set of items and knapsack capacity. Weight: {2, 3, 5, 6} Value: {20, 30, 50, 60}	10	CO2	BT3