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K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

~~Nov – Dec 2024~~ May-June 2025

B. Tech Program: **Artificial Intelligence & Data Science** Scheme **III**

Carry on Regular Examination: **SY** Semester: **III**

Course Code: **AIC303** and Course Name: **Design and Analysis of Algorithms**

Date of Exam: ~~21/11/24~~ 26/06/2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Write the algorithm for the Insertion Sort technique and discuss its time and space complexity in all cases.		CO1	Un
b)	Write a note on Assembly line scheduling		CO4	Un
c)	What is Graph Coloring? Explain with an example		CO5	Un
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Write an algorithm for finding maximum and minimum from a given set.		CO2	Un
b)	Write a note on Rabin Karp Algorithm		CO6	Un
c)	Write Kruskal's algorithm for minimum spanning tree.		CO3	Un
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Apply KMP Algorithm for the following string: T = a b c a b a b a b c b c a b Where P = b a b a b c b		CO6	Ap
b)	Write the algorithm for the Subset Sum problem and solve it for the following instance: n = 4, m= 50 w = {10, 20, 30, 40}		CO5	Ap
c)	Solve the following TSP problem using Dynamic programming		CO4	Ap

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	1 2 3 4 1 0 10 15 20 2 5 0 9 10 3 6 13 0 12 4 8 8 9 0			
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Solve the following instances of job sequencing with deadlines problem: n=7, profits (p1, p2, p3, p4, p5, p6, p7) = (3, 5, 20, 18, 1, 6, 30) and deadlines (d1, d2, d3, d4, d5, d6, d7) = (1, 3, 4, 3, 2, 1, 2). Schedule the jobs in such a way so as to get maximum profit.		CO3	Ap
b)	Explain the Divide and Conquer strategy in algorithm design. Provide examples of algorithms that implement this approach and analyze their time complexities.		CO2	Un
c)	Sort the given array using Selection Sort technique: Array- [34, 7, 23, 32, 5, 62, 32, 14]		CO1	Ap

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