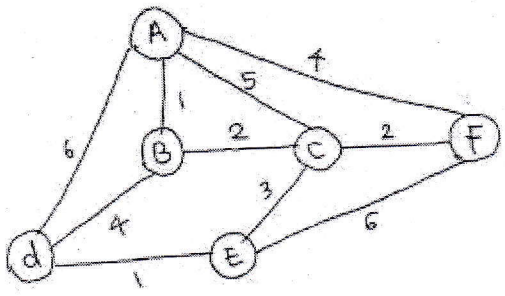
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

July - Aug Carry On
~~May - June~~ 2025
B. Tech Program: Artificial Intelligence and Data science Scheme III
Supplementary Examination: SY Semester: III
Course Code: AIC303 and Course Name: Design and Analysis of Algorithm
Date of Exam:13/08/2025 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)	Describe the relationship among P, NP, and NP-Hard problems.		CO1	U
b)	Sort the elements {11, 7, 17, 3, 9, 29, 85, 9} using insertion sort and analyze its time complexity.		CO1	Ap
c)	Describe Recursion tree method.		CO1	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Solve $T(n) = 4T(n/2) + n^2$ using masters theorem method.		CO1	Ap
b)	Write an algorithm for Binary search.		CO2	U
c)	Trace quicksort for the dataset A = {44, 22, 33, 77, 11, 55, 66}.		CO2	Ap
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Find the minimum spanning tree of a given graph using Kruskal's algorithm 		CO3	An

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b)	Explain 0/1 Knapsack problem using dynamic programming and solve the given example if Items represented with pair of profit and weight Items=(18,3),(25,5),(27,4)(10,3)(15,6); Capacity=7.		CO4	An
c)	Solve the 8-Queens problem using backtracking		CO5	An
Q.4	Solve any **two** questions out of three. (10 mark each).	20		
a)	Write an All pair shortest path: Floyd Warshall Algorithm,		CO4	U
b)	Explain Traveling Salesman Problem using bunch and bound.		CO5	U
c)	Explain Naïve string matching algorithm in detail.		CO6	U

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