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

April – May 2024

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

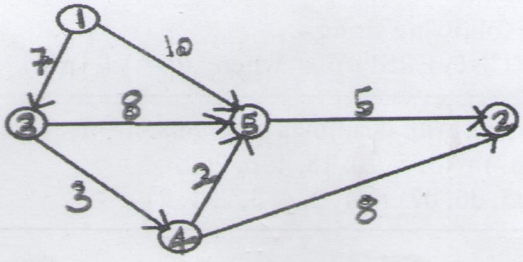
Supplementary Examination: SY Semester: IV

Course Code: **AIC402** and Course Name: **Analysis of Algorithm**

Date of Exam: 27/07/2024 Duration: 2.5 Hours Max. Marks: 60

27/07/2024

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

		Max. Marks	CO	BT level
Q 1	**Solve any six questions out of eight.**	**12**		
i)	What is travelling salesman problem?	**2**	**CO4**	R
ii)	Define Big-Oh (O), Omega (Ω), and Theta (ϴ) notations	**2**	**CO1**	R
iii)	What is Greedy approach?	**2**	**CO3**	R
iv)	What are the best case, worst case and average case time complexity of Quick sort algorithm?	**2**	**CO2**	U
v)	Write algorithm of Min-Max method.	**2**	**CO2**	U
vi)	What is Graph Colouring?	**2**	**CO5**	R
vii)	What are spurious Hit and Valid Hit is in string Matching Algorithm?	**2**	**CO6**	R
viii)	List different search techniques in Branch and Bound?	**2**	**CO5**	R
Q.2	**Solve any four questions out of six.**	**16**		
i)	Discuss in detail about Rabin Karp String matching algorithm.	**4**	**CO6**	U
ii)	Find a minimum cost path from 3 to 2 in the given graph using dynamic programming. 	**4**	**CO4**	Ap

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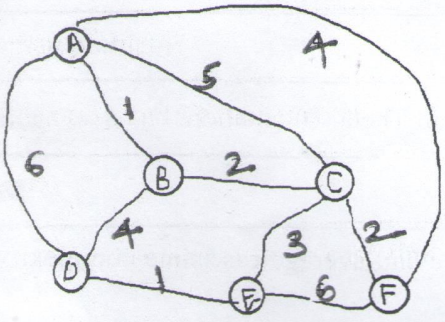
April – May 2024

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

Examination: SY Semester: IV

Course Code: **AIC402** and Course Name: **Analysis of Algorithm**

Date of Exam: 24/04/2024 Duration: 2.5 Hours Max. Marks: 60

iii)	Find the following recurrence relation by forward substitution method. $T(n) = T(n-1) + 2n - 1$; if $n>0$ $T(n) = 0$; if $n=0$	4	CO1	Ap
iv)	Find out maximum and minimum elements of an array: X [0:9] = (45, 83, 75, 17, 43, 37, 80, 53, 61, 22) Min-Max algorithm.	4	CO2	Ap
v)	Trace Quicksort for the data set: A={100, 85, 179, 354, 450, 223, 620, 145, 456}	4	CO3	Ap
vi)	Find MST with Prim's algorithm. 	4	CO2	
Q.3	**Solve any two questions out of three.**	**16**		
i)	Discuss in detail Insertion Sort and solve A={21, 17, 07, 33, 69, 29, 55, 19, 45, 54}.	8	CO1	Ap
ii)	Solve the 4-Queens problem with state space tree for the same.	8	CO5	Ap
iii)	What is 0/1 Knapsack and Fractional Knapsack problem? Solve the following using fractional knapsack method. Knapsack capacity C=11. Profit (P) = {10, 5, 15, 7, 6, 18, 3} , Wight (W) = {2, 3, 5, 7, 1, 4, 1}.	8	CO4	Ap
Q.4	**Solve any two questions out of three.**	**16**		
i)	Sort given elements using merge sort: {50, 31, 71, 38, 12, 33, 5,710, 55, 100}	8	CO2	Ap
ii)	Apply KMP Algorithm for the following string: T = SOMAIYAVIDYAVIHARUNIVERSITY where P = VIHAR	8	CO6	Ap
iii)	Solve the following Job sequencing with deadlines problems. n = 7, Profits (p1, p2, p3, p4, p5, p6, p7) = (3, 5, 20, 18, 1, 6, 30. Deadlines (d1, d2, d3, d3, d4, d5, d6, d7) = (1, 3, 4, 3, 2, 1, 2)	8	CO3	Ap