

Maharashtra Institute of Technology, Aurangabad

(An Autonomous Institute)

END SEMESTER EXAMINATION

First Year M.Tech(CST) -April/May 2022

Course Code : MTC102

Course Name : Advanced Algorithms

Duration : 2 Hrs

Max. Marks : 50

Date : 07/04/2022

Instructions :

- i) All questions are compulsory
- ii) Assume suitable data wherever necessary and clearly state it
- iii) Figures to the right indicate full marks

Q. 1	Solve/Answer Any Five (Marks : 10)					
	Questions	Marks	CO	BL	PO	PI
a)	Explain time complexity of sorting methods	2	1	2	2	2,4,1
b)	Explain Hamiltonian Cycle	2	4	2	4	4,3,1
c)	Explain Comparison sort	2	2	2	4	4,3,1
d)	Explain Rod cutting	2	1	2	2	2,4,1
e)	Explain master method for solving recurrences,	2	1	2	2	2,4,1
f)	Explain cooks theorem.	2	6	2	4	4,3,1
Q. 2	Derive the time and space complexities of Merge sort algorithm in detail, give an example.	8	2	3	4	4,3,4
Q. 3	How do you classify randomized algorithms, explain it in detail with an example.	8	3	3	2	2,4,4
Q. 4	Given strings, show the steps taken by the Rabin-Karp algorithm for the given problem instance.	8	5	3	4	4,3,4
Q. 5	Write an algorithm for multiplication of two polynomials. Consider dense representation of polynomials. Analyze the algorithm with number of additions, subtractions and multiplication required. OR	8	4	3	4	4,3,4
Q. 5	Given a practical application , show how it can be formulated as a max-flow problem.	8	3	3	2	2,4,4
Q. 6	Given an NP complete problem , prove that it is NP complete by reduction. OR	8	6	3	4	4,3,4
Q. 6	Define an NP hard problem using polynomial reducibility.	8	6	3	4	4,3,4