



R22 Regulation

Subject code: E252PC1

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

M.TECH II Semester Supplementary Examinations, March 2026

ADVANCED ALGORITHMS

(CSE)

Maximum Marks: 60

Date:05.03.2026

Duration: 3 hours

- Note: 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Name one algorithm used to perform topological sorting.	1M	1	L1
b)	Define Breadth-First Search.	1M	1	L1
c)	State the greedy algorithm paradigm in brief.	1M	2	L1
d)	Define maximum matching.	1M	2	L1
e)	Give the maxflow-mincut theorem.	1M	3	L1
f)	Define LUP decomposition.	1M	3	L1
g)	What for the Floyd-Warshall algorithm used?	1M	4	L1
h)	Brief the interpolation problem in the context of polynomials.	1M	4	L1
i)	Define a basic feasible solution.	1M	5	L1
j)	Differentiate NP-complete and NP-hard problems.	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) Analyze the time complexity of DFS.	5M	1	L3
	b) Describe how amortized analysis differs from average-case and worst-case analysis.	5M		L3
OR				
3	Compare and contrast Merge Sort and Quick Sort in terms of time and space complexity.	10M	1	L2
4	a) Use the greedy algorithm to find an MST on a given weighted graph.	5M	2	L2
	b) Describe how the maximum weight maximal independent set is computed using the greedy algorithm.	5M		L3
OR				
5	Apply Edmond's Blossom algorithm step-by-step on a graph with an odd-length cycle to find a maximum matching.	10M	2	L3
6	Illustrate the execution of Edmond-Karp algorithm on a small network and show how shortest augmenting paths are selected.	10M	3	L2

	OR			
7	a) Discuss the difference between Ford-Fulkerson and Edmond-Karp algorithms. b) Describe how to compute the inverse of a triangular matrix efficiently.	5M 5M	3	L3 L3
8	Given a weighted directed graph with 4 vertices, apply the Floyd-Warshall algorithm step-by-step to find the shortest paths between all pairs of vertices.	10M	4	L2
	OR			
9	Outline the steps of the Schonhage-Strassen algorithm for multiplying large integers.	10M	4	L2
10	a) Why does the Simplex algorithm terminate at an optimal vertex (if one exists)? b) Describe the role of reductions in establishing NP-completeness.	5M 5M	5	L2 L3
	OR			
11	Outline the difference between decision and optimization problems in the context of NP-completeness.	10M	5	L2