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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, M. Tech - Computer Science and Engineering (MCSE)

Semester End Examination; June -2022

Advanced Algorithms

Time: 3 hrs *Max. Marks: 100*

Course Outcome

The Students will be able to:
CO1: Analyze and find the complexity of the given problem.
CO2: Design efficient algorithm using Divide-and-Conquer Strategy.
CO3: Design and analyze algorithms to optimization problems.
CO4: Compute optimal solution for the problem using approximation algorithms.
CO5: Apply randomized algorithms for the given problem.

Note: I) *Answer any* ***FIVE*** *full questions, selecting* ***ONE*** *full question from each unit.*
II) *Any* ***THREE*** *units will have internal choice and remaining* ***TWO*** *unit questions are compulsory.*
III) *Each unit carries 20 marks.*

Q. No.	Questions	Marks	BLs	COs	POs
	UNIT - I	**20**			
1 a.	Determine the time complexities of the binary search for the following cases: i) Best case ii) Average case iii) Worst case	10	L2	CO1	
b.	Write a greedy algorithm for finding Kruskal's minimum spanning tree.	10	L1	CO1	
	UNIT - II	**20**			
2 a.	Apply a divide-and-conquer strategy to find the maximum of eight number given below; "29, 14, 15, 1, 6, 10, 32, 12"	10	L3	CO2	
b.	Write an algorithm to construct voronoi diagram using divide-and-conquer technique.	10	L2	CO2	
	OR				
c.	Write the Euclidean nearest neighbor searching problem.	10	L2	CO2	
d.	Write an A^* algorithm with an example.	10	L2	CO2	
	UNIT - III	**20**			
3 a.	Write a prune-and-search algorithm to solve 2-variable linear programming problem.	10	L2	CO3	
b.	Explain the RNA maximum base pair matching problem using dynamic programming with an example.	10	L1	CO3	
	OR				
c.	Write weighted single step graph edge searching problem on trees with an example.	10	L2	CO3	
d.	Write Prune-and-search algorithm to solve special linear programming problem.	10	L3	CO3	

Contd…2

UNIT - IV **20**

4 a.	Write an approximation algorithm for the Euclidean travelling salesperson problem with an example.	10	L2	CO4
b.	Write an approximation algorithm for a special bottleneck weighted K-supplier problem.	10	L2	CO4

OR

c.	Write an approximation algorithm for the multiple sequence alignment problems with an example.	10	L2	CO4
d.	Write a 2-approximation algorithm for the sorting by transportation problem.	10	L2	CO4

UNIT - V **20**

5 a.	Write a randomized algorithm to test whether a number is a prime with an example.	10	L2	CO5
b.	Write the online k-server problem and a greedy algorithm to solve this problem define on planar trees.	10	L2	CO5

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