



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

III B.Tech I Sem Regular End Examination, December 2022

Design and Analysis of Algorithms

(CSD)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1. a) Write the Space Complexity and Time Complexity with examples. 2M C01 BL1
- b) List the applications of Binary search. 2M C01 BL2
- c) What is a spanning tree? Write the minimum cost spanning trees. 2M C02 BL1
- d) Is Dijkstra single source shortest path algorithm? Justify the statement. 2M C02 BL2
- e) What is reliability design? 2M C03 BL1
- f) What is the complexity of optimal binary tree? 2M C03 BL1
- g) List the application of the backtracking. 2M C04 BL2
- h) What is meant by Hamiltonian cycle? 2M C04 BL1
- i) What is the basic principle of branch and bound technique? 2M C05 BL1
- j) Write the classes of P and NP. 2M C05 BL1

PART- B

(10*5 Marks = 50 Marks)

- 2 a) Explain various Asymptotic notations with the properties. 5M C01 BL3
- b) Discuss the Quick sort algorithm. Analyze the time complexity in worst case 5M C01 BL4

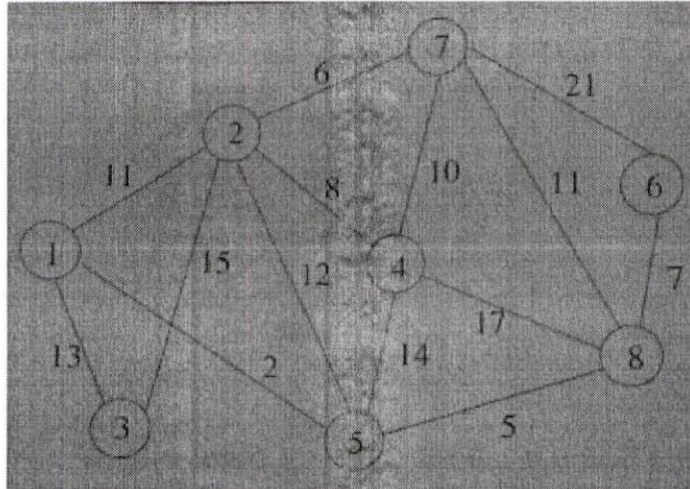
OR

- 3 a) Define omega notation. Explain the terms involved in it. Give an example. 5M C01 BL2
- b) Explain in detail about Merge sort. Show how it works with the following data set {100,300,150,450,250,350,200,400,500} 5M C01 BL3
- 4 a) What are the steps required to develop a greedy algorithm? Discuss 5M C02 BL2
- b) Explain the method of finding the minimum spanning tree for a connected graph using Prim's algorithm. 5M C02 BL3

OR

5 a) Discuss the problem of job sequencing with deadlines by taking an example. 5M C02 BL4

b) 5M C02 BL4



Find the minimum spanning tree using prim's algorithm.

6 a) Using branch and bound technique explain the 0/1 knapsack problem. 5M C03 BL3

b) Explain the Optimal binary search trees. 5M C03 BL4

OR

7 Find the optimal binary search tree for the key and probabilities given 10M C03 BL2

Key	A	B	C	D
probabilities	0.1	0.2	0.4	0.3

8 Explain the N-Queens problem with an algorithm 10M C04 BL3

OR

9 Generalize Hamiltonian so that it processes a graph whose edge have costs associated with then and finds a Hamiltonian cycle with minimum cost. You can assume that all edge costs are positive. 10M C04 BL4

10 a) Discuss how these bound are useful in Branch and Bound methods. 5M C05 BL3

b) Explain the strategy to prove that a problem is NP hard 5M C05 BL4

OR

11 Discuss the method of reduction to solve TSP problem using Branch and Bound 10M C05 BL3

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