

Code No: 156AN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, January/February - 2025

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, ECM, CSBS, ITE)

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.  
 ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.  
 iii) 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****(25 Marks)**

- a) What is little oh notation? [2]
- b) What is the worst case time complexity of merge sort? [3]
- c) Write union algorithm. [2]
- d) What is graph coloring problem? [3]
- e) What is 0/1 knapsack problem? [2]
- f) What is the time complexity of travelling salesperson problem? [3]
- g) What are the applications of spanning tree? [2]
- h) What is the space complexity of single source shortest path? [3]
- i) What is NP hard problem? [2]
- j) What is the general idea behind branch and bound? [3]

**PART – B****(50 Marks)**

2. Simulate Quick sort on following data and write algorithm for it. [10]  
2,5,6,1,8,7,9,4
- OR**
3. Solve strassen's matrix multiplication through divide and conquer method and derive its time complexity. [10]
  4. Write algorithm for n-queen's problem and derive its time complexity. [10]
- OR**
- 5.a) Write down algorithm for find an element in disjoint set. [5]
  - b) Explain in detail about graph coloring problem using backtracking. [5]
6. Write algorithm to find optimal binary search tree and derive its time complexity. [10]
- OR**
7. What is all pairs shortest path problem? Explain with an example. Write down algorithm for it. [10]
  8. Write down algorithm for prim's method and derive its space and time complexity. [10]
- OR**
9. Explain job sequencing with deadlines and write down algorithm for it. [10]
  10. Give solution to travelling sales person problem using FIFO Branch and Bound. [10]
- OR**
11. Give solution to 0/1 knapsack problem using LC Branch and Bound. [10]