



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 2P5ED

B.Tech V Semester Regular/Supplementary Examinations, December 2021
DESIGN AND ANALYSIS AND ALGORITHMS

(Computer Science and Engineering)

Maximum Marks: 70

Date: 07.01.2022 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 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

(10x2M=20 Marks)

- 1 Define the terms: i) Time Complexity ii) Space Complexity.
- 2 State the analysis of Binary Search.
- 3 Give a brief note on Graph coloring?
- 4 Draw the state-space tree along with answer nodes for 4-queens problem.
- 5 State the KNAPSACK problem. What is the difference between KNAPSACK and 0/1 KNAPSACK problem?
- 6 State the Job – Sequencing with Deadline Problem.
- 7 What is Traveling sales man Problem.
- 8 Give the statement of Reliability design problem.
- 9 State the Methodology of Branch and Bound.
- 10 Define Bounding function?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) Distinguish between Merge sort and Quick Sort. [4]
b) Derive the time complexity of the Quicksort algorithm for the worst case. [6]
OR
- 12 a) Explain the Recursive Binary search algorithm with suitable examples. [6]
b) Write the general method of Divide – And – Conquer approach with example. [4]
- 13 a) Write and explain the algorithm of Bi-connected components with an example? [6]
b) Give the solution to 8 queen problem using backtracking. [4]
OR
- 14 a) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm? [6]
b) Explain the AND/OR graph problem with an example. [4]
- 15 a) Explain the greedy technique for solving the job sequencing problem. [3]
b) State the Job– Sequencing with deadlines problem. Find an optimal sequence, $n=5$ Jobs where profits.
(P_1, P_2, P_3, P_4, P_5) = (20, 15, 10, 5, 1) and deadlines (d_1, d_2, d_3, d_4, d_5) = (2, 2, 1, 3, 3). [7]
OR

- 16 a) Explain the Knapsack problem with an example. [5]
b) What are greedy algorithms? What are their characteristics? Explain any greedy algorithm with example. [5]
- 17 a) With the help of suitable example explain all pair shortest path problem. [5]
b) Explain Single source shortest path problem. [5]
- OR
- 18 Explain how Matrix– chain Multiplication problem can be solved using dynamic programming with suitable example. [10]
- 19 a) Explain FIFO Branch and Bound solution. [4]
b) Draw the portion of the state space tree generated by LC branch and bound of knapsack problem for an instance $n=4$, $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$, $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$, and $m=15$. [6]
- OR
- 20 Solve the Travelling Salesman problem using branch and bound algorithms. [10]