



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code: 2P5FD

B.Tech V Semester Supplementary Examinations, July 2022
DESIGN AND ANALYSIS AND ALGORITHMS

(IT)

Maximum Marks: 70

Date:06.07.2022 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 Describe the Algorithm Analysis of Binary Search?
- 3 Give a brief note on Graph coloring?
- 4 List out the rules 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? Give the statement of 0/1 Knapsack FIFO BB

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 a) Distinguish between Merge sort and Quick Sort.
b) Derive the time complexity of the Quicksort algorithm for the worst case. [5+5]
OR
- 12 a) Explain the Recursive Binary search algorithm with suitable examples
b) Write the general method of Divide – And – Conquer approach. [5+5]
- 13 a) Write and explain the algorithm of Bi connected components with an example?
b) Give the solution to 8 queen problem using backtracking. [5+5]
OR
- 14 a) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm?
b) Explain the AND/OR graph problem with an example. [5+5]
- 15 a) Explain the greedy technique for solving the job sequencing problem
b) State the Job– Sequencing with deadlines problem. Find an optimal sequence to then= 5 Jobs where profits (P1, P2, P3, P4, P5) = (20, 15, 10, 5, 1) and deadlines(d1, d2, d3, d4, d5) =(2, 2, 1, 3, 3). [5+5]
OR
- 16 a) Explain the Knapsack problem with an example
b) Explain any greedy method algorithm with example. [5+5]

- 17 a) With the help of suitable example explain all pair shortest path problem
b) Explain Single source shortest path problem. [5+5]

OR

- 18 a) Describe about reliability design with an example
b) Explain how Matrix– chain Multiplication problem can be solved using dynamic programming with suitable example. [5+5]

- 19 a) Explain FIFO Branch and Bound solution
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 $m=15$. [5+5]

OR

- 20 Consider the following TSP cost matrix; draw the state space tree by using LCBB. [10]

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

(a) Cost matrix