R18 Regulation *Subject code: 2P5FD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Regular/Supplementary Examinations, December 2021

DESIGN AND ANALYSIS OF ALGORITHMS

(Information Technology)

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 time and Space complexity with an example.
2 Find worst case, best case, average case time complexity of the binary search.
3 Explain the properties of strongly connected components.
4 List the applications of backtracking.
5 Write control abstraction of the Greedy method.
6 Define Job sequencing with deadlines with an example.
7 State the principle of optimality with an example.
8 Explain travelling sales person problem.
9 Distinguish between deterministic and non deterministic algorithm.
10 Write the control abstraction algorithm for LC search.

Part-B

Answer All the following questions. (10M X 5=50Marks)

11 a) Solve the following recurrence: [5]
T (n) =4T (n/2) +n, where n ≥ 1 and is a power of 2.
b) Sort the records with the following index values in the ascending order using quick sort algorithm. 2, 3, 8, 5, 4, 7, 6, 9. [5]

OR

12 Explain Stassen's Matrix Multiplication with an example. [10]

13 Explain 8-queen problem using back tracking method. [10]

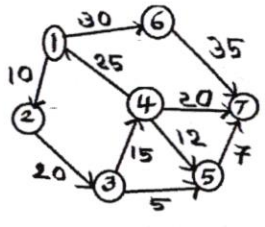
OR

14 What is sum-of-subsets problem? Write a recursive backtracking algorithm for sum of subsets problem. [10]

15 Consider the Knapsack instance with n=3, m=20.
(P1, P2, P3) = (25,24,15), (W1, W2, W3) = (18,15,10). find the optimal solution using greedy method? [10]

OR

16 Solve single source shortest path problem with given graph? [10]



17 Consider the Knapsack instance n=3, (w1, w2, w3) = (2,3,4), (p1,p2,p3)=(1,2,5),m=6 find the optimal solution using Dynamic programming? [6]
b) Show Reliability Design with an Example. [4]

OR

18 Design an OBST for c(i,j) $0 \leq i \leq j \leq 4$ the identifier set(a1,a2,a3,a4)= (do, if, int, while) with (p1,p2,p3,p4)=(3,3,1,1) and q(0:4)=(2,3,1,1,1) [10]

19 Draw the portion of the state space tree generated by LCBB for the knapsack instances: n=5, (P1, P2,… , P5) = (12,10,5,9,3), (w1, w2, ...,w5)=(3, 5, 2, 5, 3) and M =12. [10]

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