



R20 Regulation *Subject code:3P4FE*
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
 (Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Supplementary Examinations, December 2024

DESIGN AND ANALYSIS OF ALGORITHMS
(Information Technology)

Maximum Marks: 70

Date:10.12.2024

Duration: 3 hours

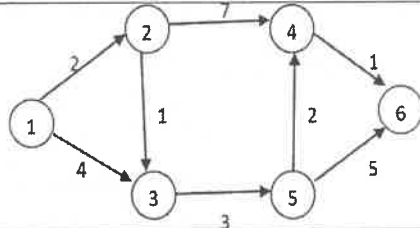
- Note: 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks		(10X2M=20) Marks)	CO	Bloom Tx
1	What is an algorithm?		1	L1
2	What are algorithm design techniques?		1	L1
3	Write an algorithm of simple union.		2	L1
4	What is AND/OR graphs?		2	L1
5	What is greedy method?		3	L1
6	Define feasible solution.		3	L1
7	What is Floyd-warshall algorithm?		4	L1
8	What is optimal binary search tree?		4	L1
9	What is class P and NP?		5	L1
10	Define NP-Hard and NP-Complete problems		5	L1

Part-B

Answer All the following questions.		(5X10M=50Marks)	CO	Bloom Tx
11	Write an algorithm for binary search using iterative method and sort the following elements? Write the recurrence relation. 3,6,8,12,14,17,25,29,31,36,42,47,53,55,62. [10M]		1	L2
OR				
12	Explain Asymptotic Notations with suitable examples? [10M]		1	L2
13	Write and explain the algorithm of Bi connected components with an example [10M]		2	L2
OR				
14	Write an algorithm of DFS. Explain DFS with a suitable example. [10M]		2	L2
15	Using Dijkstra's algorithms find the shortest path from vertex 1 vertex 6 for the following graph. [10M]		3	L2



OR

16	<p>Explain knapsack problem with an algorithm. Consider the following instance of knapsack problem $n=7, m=15$, profits $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10, 15, 12, 4, 6, 16, 8)$ and weights $(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2, 4, 5, 4, 2, 3, 3)$. Obtain the optimal solution using greedy approach [10M]</p>	3	L2
17	<p>A. Explain the methodology of Dynamic programming. List the applications of Dynamic programming. [5M] B. Explain Reliability design problem? [5M]</p>	4	L2
OR			
18	<p>Describe the dynamic 0/1 knapsack problem. Find an optimal solution for the dynamic programming 0/1 knapsack instance for $n=4, m=8$, profits are $(p_1, p_2, p_3, p_4) = (1, 2, 5, 6)$, weights are $(w_1, w_2, w_3, w_4) = (2, 3, 4, 5)$. [10M]</p>	4	L2
19	<p>Draw the portion of the state space tree generated by LCBB for the following knapsack instances: $N=5$, [10M] $(P_1, P_2, P_3, P_4, P_5) = (W_1, W_2, W_3, W_4, W_5) = (4, 4, 5, 8, 9)$ and $m=15$.</p>	5	L2
OR			
20	<p>A) Is travelling salesman problem NP-hard or NP-Complete? Justify your answer. [5M] B) Explain the classes of NP-hard and NP-complete. [5M]</p>	5	L2