



-+ R18 Regulation

Subject code:2P5ED&2P5FD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, December 2024

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE & IT)

Maximum Marks: 70

Date:03.01.2025

Duration: 3 hours

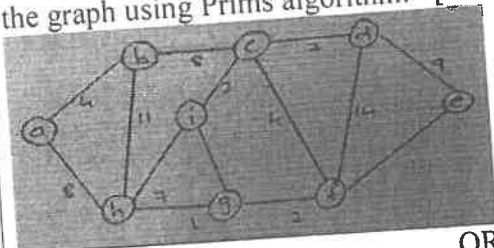
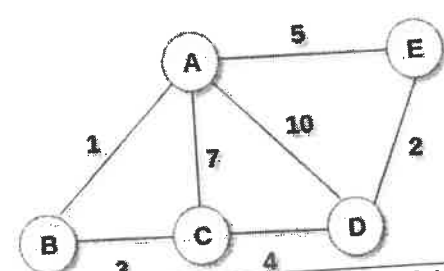
- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub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

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	What is an algorithm?	1	L1
2	Write the characteristics of an algorithm?	1	L1
3	What is an articulation point in a graph?	2	L1
4	Define strongly connected components in a graph.	2	L1
5	Define feasible solution.	3	L1
6	Define Spanning tree.	3	L1
7	Write the general procedure of dynamic programming.	4	L1
8	Define optimal Solution.	4	L1
9	What is LC branch and bound method?	5	L1
10	Define P and NP class of problems.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Write the steps required to perform quick sort and sort the following elements using divide and conquer procedure of Quick sort and calculate the time complexity for the elements 30, 20, 10, 50, 60, 40. [10M]	1	L2
OR			
12	A) Write an algorithm to implement merge sort technique. [5M] B) Explain in detail quick sorting method. Provide a complete analysis of Quick sort. [5M]	1	L2
13	What is Graph coloring? Write an algorithm and explain with an example. [10M]	2	L2
OR			
14	Write an algorithm to implement 8-Queens Problem. Analyze the algorithm for its space & time complexity. [10M]	2	L2

15	Explain Prim's algorithm and compute minimum cost spanning tree for the graph using Prim's algorithm. [10M] 	3	L2
16	Write the Kruskal's Algorithm for the Minimum Spanning Tree. Analyze its Time complexity. Compute the Minimum Cost Spanning Tree and its cost for the following tree. [10M] 	3	L2
17	a) Discuss about the general method of dynamic programming. [5M] b) Differentiate between divide and conquer method and dynamic programming. [5M]	4	L2
18	OR [2M] A) Define Reliability Design Problem B) Design a reliable three state system with three device types D1, D2 and D3. The costs are \$30, \$15 and \$20 respectively. The cost of system is to no more than \$105. The reliability if each device type is 0.9, 0.8 and 0.5 respectively. [8M]	4	L2
19	Explain 0/1 Knapsack Problem using least cost branch and bound technique. [10M]	5	L2
20	OR A) Discuss about Cook's theorem. [5M] B) Difference between NP hard and NP complete. [5M]	5	L2