Reg. No.										

Question Paper Code	11980

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023
First Semester
M.E. - Computer Science and Engineering
20PCSPC101 — ADVANCED DATA STRUCTURES AND ALGORITHMS
(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	How to measure the algorithm running time?	2,K2,CO1
2.	What is the typical growth rate of algorithm?	2,K1,CO1
3.	List the properties of red black tree.	2,K1,CO2
4.	What is the advantage over B+ tree when compared to B tree?	2,K2,CO2
5.	Give the structure for strongly connected graph.	2,K1,CO3
6.	How to calculate the efficiency of dijkstra's algorithm?	2,K2,CO3
7.	What do you means by dynamic programming?	2,K2,CO4
8.	State the elements of greedy strategy.	2,K1,CO4
9.	What is the need of polynomial time algorithm?	2,K1,CO5
10.	Define Reducibility.	2,K1,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11.	a)	(i) Describe in detail about Asymptotic Notation with an example.	7,K2,CO1
		(ii) How to analyze the Algorithms?	6,K3,CO1

OR

	b)	What is recurrence? List the methods for solving recurrence. Describe the steps involved in substitution method to solve recurrence.	13,K2,CO1

12.	a)	(i) Illustrate insertion and deletion operation of Binary search tree with suitable example.	10,K2,CO2
		(ii) Compare binary search tree with B-Tree.	3,K2,CO2

OR

	b)	Show how to decrease the key of a node in a Fibonacci heap and how to delete any node from an n-node Fibonacci heap.	13,K4,CO2

K1 — Remember; K2 — Understand; K3 — Apply; K4 — Analyze; K5 — Evaluate; K6 — Create

13. a) (i) Describe the basic concept of Bellman ford algorithm with an example. 7,K2,CO3
(ii) Write an algorithm to compute strongly connected components using DFS. 6,K3,CO3

OR

b) (i) Explain the algorithm of Floyd's and Warshall's with a suitable example and mention its time complexity. 7,K3,CO3
(ii) How do you obtain Minimum spanning tree for a tree? 6,K4,CO3

14. a) Write Short notes on the following,
(i) Matric chain multiplication. 7,K3,CO4
(ii) Longest common subsequence. 6,K3,CO4

OR

b) (i) Discuss the general properties of Greedy method. 7,K2,CO4
(ii) Illustrate the construction of aActivity selection problem. 6,K3,CO4

15. a) Prove that the circuit-satisfiability problem belongs to the class NP and also NP-Hard. 13,K4,CO5

OR

b) Elaborate the following,
(i) NP Hard problem. 7,K3,CO5
(ii) NP Complete problem. 6,K3,CO5

PART - C (1 × 15 = 15 Marks)

16. a) Explain the steps in Building the Huffman tree. Find the codes for the alphabets given below according to the frequency. 15,K4,CO4
Character: A B C D E F G H I J K L M N O
Frequency: 2 1 1 2 4 2 1 2 1 2 5 2 4 3 1

OR

b) Consider the following weighted graph, 15,K3,,CO3
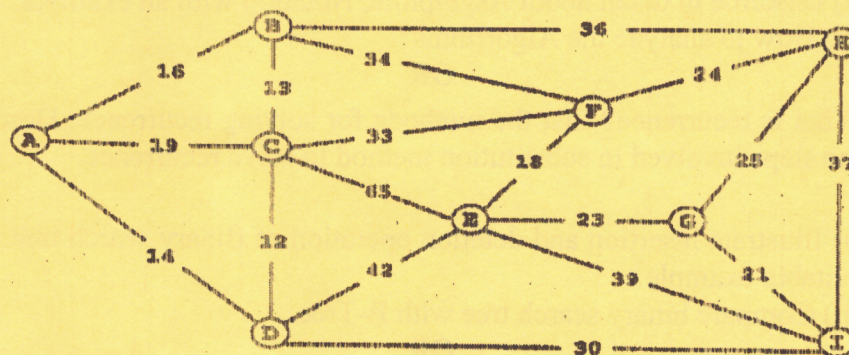
Give the list of the MST in the order that prim's algorithm inserts them.Start prims algorithm from vertex A.