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Question Paper Code	21322
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M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

First Semester

M.E. - Computer Science and Engineering

(Common to M.E. - Computer Science and Engineering (With Specialisation in Networks))

20PCSPC101 - ADVANCED DATA STRUCTURES AND ALGORITHMS

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

	<i>Marks, K-Level, CO</i>
1. Define Recursion.	<i>2,K1,CO1</i>
2. Define the best, worst, average case time Complexity.	<i>2,K1,CO1</i>
3. List the applications of trees.	<i>2,K1,CO2</i>
4. Define Red Black tree.	<i>2,K1,CO2</i>
5. What is an Adjacency List?	<i>2,K1,CO3</i>
6. Define minimum spanning tree. Give an example?	<i>2,K1,CO3</i>
7. Define graph and its types.	<i>2,K1,CO4</i>
8. Define Single source Shortest path algorithm.	<i>2,K1,CO4</i>
9. What is principle difference between dynamic programming and divide and Conquer techniques?	<i>2,K1,CO5</i>
10. State the general principles of greedy algorithm	<i>2,K1,CO5</i>

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Explain Big O, Omega and Theta notation with examples.	<i>13, K2,CO1</i>
<b>OR</b>	
b) Explain in detail the various methods for solving recurrence.	<i>13, K2,CO1</i>
12. a) Explain in detail about the various operations associated with B Trees.	<i>13, K2,CO2</i>
<b>OR</b>	
b) Explain in detail Fibonacci heap with example.	<i>13, K2,CO2</i>
13. a) (i) Discuss the Depth first Search algorithm with example.	<i>7, K2,CO3</i>
(ii) Discuss an algorithm for Breadth first Search on a graph.	<i>6,K2,CO3</i>

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

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**OR**

b) What is topological sort? Write an algorithm to perform topological sort. *13, K2, CO3*

14. a) Explain the working of Prim's Algorithm in detail. *13, K2, CO4*

**OR**

b) Discuss in detail the Dijkstra's Shortest path Algorithm and its efficiency. *13, K2, CO4*

15. a) Explain how Matrix – chain Multiplication problem can be solved using dynamic programming with suitable example. *13, K2, CO5*

**OR**

b) Describe greedy algorithm with an example. *13, K2, CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) Illustrate the P, NP and NP completeness with suitable examples. *15, K3, CO6*

**OR**

b) Summarize on deterministic and non-deterministic algorithms. *15, K3, CO6*