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| Question Paper Code | 13369 |
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M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024 (JAN - 2025)

First Semester

M.E. - Computer Science and Engineering

(Common to M.E. Computer Science and Engineering (with Specialization in Networks))

20PCSPC101 / 24PCSPC101 - ADVANCED DATA STRUCTURES AND ALGORITHMS

Regulations – 2020 / 2024

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

| | Marks | K-Level | CO |
|---|-------|---------|-----|
| 1. What is the time complexity of an algorithm? | 2 | K1 | CO1 |
| 2. List the important problems that are solved by algorithms. | 2 | K1 | CO1 |
| 3. What is the procedure to delete a key from B-Tree? | 2 | K1 | CO2 |
| 4. List out the properties of Red black tree. | 2 | K1 | CO2 |
| 5. What is an Adjacency Matrix? | 2 | K1 | CO3 |
| 6. Define minimum spanning tree. Give an example. | 2 | K1 | CO3 |
| 7. What is all pair shortest path algorithm? | 2 | K1 | CO4 |
| 8. Define Floyd Warshall algorithm. | 2 | K1 | CO4 |
| 9. Recall greedy technique. | 2 | K1 | CO5 |
| 10. What is meant by principle of optimality? | 2 | K1 | CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Explain the method of solving recurrence equations with suitable example. 13 K2 CO1

OR

b) Describe the method of solving Non recursive equations with suitable examples. 13 K2 CO1

12. a) Explain in detail about the various operations associated with BTrees. 13 K2 CO2

OR

b) Write an algorithm for inserting and deleting a node in a binary search tree. 13 K2 CO2

13. a) What is meant by topological sort? Write an algorithm to perform topological sort to sort 45, 12, 90, 08, 11, 32, 67, 13, 27. 13 K2 CO3

OR

b) Compare and contrast depth-first search and breadth-first search traversal of a graph with suitable examples. 13 K2 CO3

14. a) Explain the Dijkstra's Shortest path algorithm and its efficiency. 13 K2 CO4

OR

b) Demonstrate the working of Bellman-Ford algorithm with an example. 13 K2 CO4

15. a) Discuss in detail about in Optimal Binary Search tree. 13 K2 CO5

OR

b) Illustrate the steps involved in developing a dynamic programming algorithm. 13 K2 CO5

PART - C (1× 15 = 15 Marks)

16. a) Interpret non-deterministic sorting algorithm and also analyze its complexity. 15 K2 CO6

OR

b) Explain how P and NP problems are related with an example. 15 K2 CO6