Course Code: 23CS3T02

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

**(AUTONOMOUS)**

***II - B.Tech I-Semester Regular Examinations (BR23), Nov - 2024***

**Advanced Data Structures & Algorithms Analysis**

**(Com. to CSE, CSE – AIDS & AIML)**

Time: 3 hours Max. Marks: 70

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*Question Paper consists of Part-A and Part-B*

*Answer **ALL** the question in **Part-A and Part-B***

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PART–A (10X2 = 20M)

| | | Marks | CO | BL |
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| 1 a) | What are the features of efficient algorithm? | (2M) | CO1 | BL4 |
| b) | Define Asymptotic Notations. | (2M) | CO1 | BL4 |
| c) | Define divide and conquer design technique | (2M) | CO2 | BL3 |
| d) | What are the non-linear data structures? | (2M) | CO2 | BL3 |
| e) | Write any two characteristics of Greedy Algorithm? | (2M) | CO3 | BL3 |
| f) | Define principle of optimality. | (2M) | CO3 | BL3 |
| g) | Write the difference between the Greedy method and Dynamic programming. | (2M) | CO4 | BL4 |
| h) | List out the implementation procedure of Backtracking | (2M) | CO4 | BL4 |
| i) | Define Polynomial reducible | (2M) | CO5 | BL4 |
| j) | What is the difference between tractable and intractable? | (2M) | CO5 | BL4 |

PART–B (5X10 = 50M)

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| 2a. | What do you mean by a balance factor in AVL tree and explain about LL & RR rotations with an example. | 10(M) | CO1 | BL4 |
| | (OR) | | | |
| 3a. | What is a B-Tree. Specify its properties and describe the construction of a B-Tree for the following elements 5, 2, 13, 3, 45, 72, 4, 6, 9, 22. | 10(M) | CO1 | BL4 |

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| 4a. | Consider the given elements 78,56,32,45,8,23,19 perform heap sort | 5(M) | CO2 | BL3 |
| b. | Explain about Breadth First Search Traversal technique with an example. | 5(M) | CO2 | BL3 |
| | (OR) | | | |
| 5a. | Mention the advantage of Stressan's matrix multiplication. Explain how the Stressan's matrix multiplication works. | 10(M) | CO2 | BL3 |

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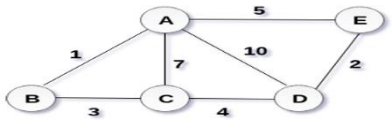
|---|---|---|---|---|
| 6a. | Apply the kruskals algorithm for below tree.<br>  | 10(M) | CO3 | BL3 |

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|---|---|---|---|---|
| (OR) | | | | |
| 7a. | Solve for Knapsack problem using Greedy method for the instance n = 7, profits (p1...p7) = (10,5,15,7,6,18,3) and weights (W1...W7) = ( 2,3,5,7,1,4,1) and capacity of sack is m = 15 | 5(M) | CO3 | BL3 |
| b. | Explain the problem Job sequencing with Deadline and solve for n = 5, (P1...P5) = (20, 15, 10, 5, 1) and Deadlines (D1...D5) = (2, 2, 1, 3, 3). | 5(M) | CO3 | BL3 |

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| 8a. | How many solutions are there to the eight queens problem? How many distinct solutions are there if we do not distinguish solution that can be transformed into one another by rotations and reflections? | 10(M) | CO4 | BL4 |
| (OR) | | | | |
| 9a. | Explain traveling sales person problem? | 10(M) | CO4 | BL4 |

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| 10a. | Give brief description about the cook's theorem and prove with example. | 10(M) | CO5 | BL4 |
| (OR) | | | | |
| 11a. | Discuss in detail the different classes in NP hard and NP complete. | 10(M) | CO5 | BL4 |

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