**Advanced Data Structures - Unit wise important questions**

**ADS UNIT I Questions**

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| 1. | a) | What is k-way merge sort? Demonstrate the merging process in the 3-way merge sort with suitable example. |
| b) | Explain optimal merging of runs with suitable example. |
| 2. | a) | Demonstrate Huffman tree with suitable example. |
| b) | Apply tournament trees to sort the elements with suitable example. |
| 3. | a) | Illustrate the Linear probing and double hashing on the given data  9,13,15,27,18,19,3, 23,24, and 25 with table size is 10. |
| b) | Define Hashing and Explain mid square method and digit folding method with suitable examples |
| 4. | a) | Differentiate Closed addressing and Open addressing. |
| b) | What is collision? Demonstrate the chaining method to resolve the collisions with suitable examples |

**ADS UNIT II Questions**

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| 1. | a) | Create a min heap for the given elements 10, 20, 15, 12, 25, 30, 14, 2, 5, 4 and after creation, perform one delete operation on it and show the final min heap. |
| b) | List various applications of Priority Queues. |
| 2. | a) | Explain the properties of Binary Heaps. |
| b) | Write an algorithm for to Max heap wit suitable example |
| 3. | a) | What is binomial heap? Build a Binomial Heap for the given elements. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10. |
| b) | Show the process of deleting a node 11 from the given binomial heap.  Binomial Heap |
| 4. | a) | Write an algorithm for **Union\_Binomial-Heap(H, H’)** |
| b) | Write an algorithm for finding the node with minimum value in binomial heap. |

**ADS UNIT III Questions**

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| 1. | a) | What is a balanced binary tree? How it is different from the BST? Discuss |
| b) | Construct a AVL Tree for the given elements 25, 12, 17, 30, 15, 14, 37, 27, 40, 29, 28 and apply required rotations to rebalance the AVL tree, if it is unbalanced. |
| 2. | a) | Discuss LL and RL Rotations with suitable examples. |
| b) | Illustrate RR and LR Rotations with suitable examples. |
| 3. | a) | Explain the properties of Red Black Trees |
| b) | Construct a Red Black tree with suitable example. |
| 4. | a) | Apply appropriate algorithms to follow properties of Red Black tree after deleting node 40 from the below Red Black tree.  deletion in a red-black tree |
| b) | Write any three cases of deletion algorithms of Red Black tree. |

**ADS UNIT IV Questions**

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| 1. | a) | Construct a B-Tree by inserting 10, 20, 30, 40, 50, 60, 70, 80 and 90 in an initially empty B-Tree of order 6. |
| b) | Explain about properties of B- Tree. |
| 2. | a) | Build a B+ Tree of order 4 by inserting following elements 1,4,9,16, 25, 20,13,15, 10, 11 and 12. |
| b) | Write a procedure to delete a node from the B+ tree with suitable example. |
| 3. | a) | Construct a Digital Search Tree by inserting the keys in the given order 0111, 1001, 0101, 0010, 1011, 1000, 0110 |
| b) | Write an algorithm to delete a key from the Digital Search Tree. |
| 4. | a) | Explain insertion operation on Digital Search Tree with suitable example. |
| b) | Demonstrate searching operation on B tree with suitable example. |

**ADS UNIT IV Questions**

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| 1. | a) | Explain about Compressed binary trie. |
| b) | Demonstrate searching operation on PATRICIA with an algorithm. |
| 2. | a) | What is a multiway trie? Construct a multiway trie for the given names based on aadhar ID. |
| b) | Discuss in detail about the Knuth Morris Pratt (KMP) algorithm with suitable example. |
| 3. | a) | Explain Brute force algorithm with suitable example. |
| b) | Find the Longest Common Subsequence (LCS) for the given strings using dynamic approach.  String 1: a b a a b a  String 2: b a b b a b |
| 4. | a) | Discuss in detail about the Boyer- Moore algorithm with example |
| b) | Illustrate KMP failure(LPS) function with example. |