

***Department of Computer Science and Engineering***

***Subject Name: Advanced Data Structures***

***Subject Code: MR22-1CS0104***

***Year & Semester: II-II***

**QUESTION BANK**

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| **Q.No** | | **QUESTION** | **MARKS** | | **SECTION** | | **UNIT** |
| 1 | | Write a note on the java interface java.util.List including its index-based methods with its implementation. | 8 | | Section-I | | 1 |
| 2 | | Explain in detail about the dynamic array and its operations with the implementation. | 8 | | Section-I | | 1 |
| 3 | | Analyze the performance of dynamic array with the increase by constant ‘k’ and constant factor ‘k’. | 8 | | Section-I | | 1 |
| 4 | | Indices are not a good abstraction for describing a more local view of a position in a sequence. How do you overcome this with an abstraction? Explain in detail. | 8 | | Section-I | | 1 |
| 5 | | Show how a node is created and inserted by different ways in a Single Linked List data structure with an illustration. | 8 | | Section-I | | 1 |
| 6 | | Implement the following operations on Single Linked List   1. Create and Insert a node at the end. 2. Delete a node at beginning and Display the values of list. | 8 | | Section-I | | 1 |
| 7 | | Show the differences of Iterators and For-Each loop with an example program. | 8 | | Section-I | | 1 |
| 8 | | Given an Infix Expression (A + B / C + D \* (E – F) ^ G). Convert it into a prefix expression by using Stack and a StringBuilder, with an algorithm. | 8 | | Section-I | | 1 |
| 9 | | Implement the process of converting an infix expression to postfix expression by using stack and string builder. | 8 | | Section-I | | 1 |
| 10 | | Given an Infix Expression (((A + B) - C \* (D / E)) + F). Convert it into a postfix expression by using Stack and a StringBuilder. | 8 | | Section-I | | 1 |
| 11 | | Briefly explain in detail about the Priority Queue with a suitable example | 8 | | Section-II | | 2 |
| 12 | | Explain about Bottom-up Heap Construction with suitable algorithm | 8 | | Section-II | | 2 |
| 13 | | Explain about Heap Data Structure and its operations | 8 | | Section-II | | 2 |
| 14 | | Write a program on Priority Queue using java.util.PriorityQueue class. | 8 | | Section-II | | 2 |
| 15 | | Write a program to Implement a Priority Queue using an array. | 8 | | Section-II | | 2 |
| 16 | | Write a note on Heap-based Priority Queue. | 8 | | Section-II | | 2 |
| 17 | | Write a program to implement Max heap using Priority Queue | 8 | | Section-II | | 2 |
| 18 | | Write a program to implement Min heap | 8 | | Section-II | | 2 |
| 19 | | Construct a simple heap from the given set of data 7,10,25,17,23,27,16,19,37,42,4 | 8 | | Section-II | | 2 |
| 20 | | Explain the various advantages of using Priority queues over normal queues | 8 | | Section-II | | 2 |
| 21 | | Insert the following list of elements into the Hash Table by using Linear Probing(size of Hash Table is 10) (36,48,66,27,23,87,10,12} | 8 | | Section-III | | 3 |
| 22 | | Explain In detail about Hashing technique in detail with examples? | 8 | | Section-III | | 3 |
| 23 | | Write about Double Hashing and Rehashing. | 8 | | Section-III | | 3 |
| 24 | | Write about Quadratic Probing. | 8 | | Section-III | | 3 |
| 25 | | Insert the following list of elements into the Hash Table by using Separate Chaining (size of Hash Table is 10)  {16,23,43,18,34,59,30,22,24,46} | 8 | | Section-III | | 3 |
| 26 | | Explain Naive String Matching algorithm with suitable example | 8 | | Section-III | | 3 |
| 27 | | Describe the Knuth-Morris-Pratt algorithm with suitable example? | 8 | | Section-III | | 3 |
| 28 | | Explain Compressed Binary Trie with suitable example? | 8 | | Section-III | | 3 |
| 29 | | Explain Binary Tries with suitable example. | 8 | | Section-III | | 3 |
| 30 | | Insert the following list of elements into the Hash Table by using Double Hashing (size of the Hash Table is 10)  (3,2,9,6,11,13,7,12) | 8 | | Section-III | | 3 |
| 31 | | Write a program to construct binary search tree with tree traversal techniques for the given set of values 1, 3, 20, 5, 6, 9, 10, 12, 15, 20,90. | 8 | | Section-IV | | 4 |
| 32 | | Differentiate between AVL tree, Red Black Tree and Binary Search Tree | 8 | | Section-IV | | 4 |
| 33 | | Explain the process of insertion and deletion of elements in a binary search tree with a suitable example. | 8 | | Section-IV | | 4 |
| 34 | | Construct a Red Black Tree by inserting the following values 8, 18, 5, 15, 17, 25, 40, 80, 60, 70,75,90. | 8 | | Section-IV | | 4 |
| 35 | | Construct a Height balanced binary search tree by inserting the following data 10, 20, 30, 40, 50, 60, 70, 80. | 8 | | Section-IV | | 4 |
| 36 | | What is Splay Tree? Explain all the rotations of splay tree in detail with example. | 8 | | Section-IV | | 4 |
| 37 | | Explain the deletion process of Red Black Tree with example. | 8 | | Section-IV | | 4 |
| 38 | | What is B-Tree? How to delete a key from B-Tree? | 8 | | Section-IV | | 4 |
| 39 | | Perform the deletion operation on the given splay tree with the following values, 3, 4, 2, 5, 6, 1.  https://lh7-us.googleusercontent.com/KD4PIaia0XQ9-kK6qv7duqcSrM0F-yiy6ZGTBxmXFdueF8hZ5KEyRHiwGDIrlRcf_TSLTEMPa3V1VrrQdAPBRkRf5HpY7JVMoM6_KbnC37_dNlueeBG-BVQ2URQ8on9EaEuYle5xhP2cUV3MDsPFfA=s2048 | 8 | | Section-IV | | 4 |
| 40 | | What is a B+ Tree? How do you construct the B+Tree? Explain with example? | 8 | | Section-IV | | 4 |
| 41 | List four representations of graph data structure. Explain each with suitable example | | 8 | Section-V | | 5 | |
| 42 | Find the Adjacency Matrix and Adjacency List for the given graph | | 8 | Section-V | | 5 | |
| 43 | Define topological sort? Explain with an example? | | 8 | Section-V | | 5 | |
| 44 | Explain Floyd-Warshall Algorithm for the given graph | | 8 | Section-V | | 5 | |
| 45 | Write a program to implement all pairs shortest path algorithm. | | 8 | Section-V | | 5 | |
| 46 | Apply Prim’s algorithm for the following graph. Mention the running time of the algorithm. | | 8 | Section-V | | 5 | |
| 47 | Apply Kruskal’s algorithm for the following graph. | | 8 | Section-V | | 5 | |
| 48 | | Find a single-source shortest path for the given graph and explain its algorithm | 8 | | Section-V | | 5 |
| 49 | | Explain Breadth-First-Search algorithm, explain it with example | 8 | | Section-V | | 5 |
| 50 | | Write a function for Depth-First-Search traversal of graph. Explain its working with an example | 8 | | Section-V | | 5 |