Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**ME – SEMESTER – I (New)– EXAMINATION – WINTER-2019**

**Subject Code: 3710215** **Date: 03-01-2020**

**Subject Name: Advanced Data Structures**

**Time: 02:30 PM TO 05:00 PM** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Discuss Open Addressing in Collision Resolution in Hashing. | **07** |
| | **(b)** | 1. What is Dictionary? How can Dictionary be implemented? | **03** |
| | | 2. The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table? | **04** |
| **Q.2** | **(a)** | Explain k-D tree. | **07** |
| | **(b)** | Write algorithm for Searching in Priority Search Tree. | **07** |
| | | **OR** | |
| | **(b)** | Explain Quad tree. | **07** |
| **Q.3** | **(a)** | Discuss algorithm of Search operation in Skip list. Also give one example to explain it. | **07** |
| | **(b)** | Explain Two Dimensional Range Searching. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Discuss Insert algorithm for Insert operation in Binary Search Tree. Also give one example to explain it. | **07** |
| | **(b)** | Discuss 4 rotation operations for Insert operation in AVL tree with example. | **07** |
| **Q.4** | **(a)** | What is B-Tree? Discuss advantage of using it. Show one example of such tree of order 4. | **07** |
| | **(b)** | Define Red-Black tree. Also discuss solution of various cases of violations that occur while inserting a node in Red-Black tree. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Discuss Brute-Force pattern matching algorithm. Count total number of comparison to search Pattern (P) from the Text (T), as given below:<br>T : *a b c a b b c a b b a*<br>P : *a b b a*<br>Show all intermediate comparisons. | **07** |
| | **(b)** | What is the importance of Failure function in KMP (Knuth-Morris-Pratt) algorithm? Show KMP Failure function's value for the following pattern in form of a table.<br>P : *a a b c a d a a b e* | **07** |
| **Q.5** | **(a)** | Discuss KMP Match algorithm to find string index of the first substring of Text (T) matching Pattern (P). | **07** |
| | **(b)** | Explain Rehashing in Brief with Example. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Discuss Standard Tries and Compressed Tries. | **07** |
| | **(b)** | Discuss Huffman coding method. Explain it with an example. | **07** |

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