R18 Regulation *Subject code:* 2P3EB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Semester Regular/Supplementary Examinations, February 2021

DATA STRUCTURES

(Computer Science and Engineering)

Maximum Marks: 70 Date: 19.02.2021 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks **(10x2M=20 Marks)**

1 Define algorithm.
2 Define linear data structure.
3 Differentiate array and linked list representation of Stack.
4 With a neat diagram represent 5 elements (45,60,75,12,9) in double linked list.
5 Define priority queue and write its applications.
6 What is a threaded binary tree?
7 Define linear searching.
8 What are the collision resolution techniques?
9 Define adjacency list.
10 Define Red-Black tree.

Part-B

Answer All the following questions, **(10MX 5=50Marks)**

11 A. Calculate time complexity of $F(n) = 10x^3 - 4x^2 + 8x - 9$. [5M]
B. Write about Asymptotic notations. [5M]

OR

12 A. Define recursion. Write a recursive algorithm to calculate factorial of a number. [5M]
B. Explain Time and Space complexity with suitable example. [5M]

13 A. Explain about representations of sparse matrix with example. [5M]
B. Write the procedure to convert given infix expression to postfix expression with an example. [5M]

OR

14 A. Design C++ functions to demonstrate queue operations. [5M]
B. Discuss operations on single linked with suitable examples. [5M]

15 A. Create max heap for the following elements (20, 12, 14, 3, 52, 15, 139, 27, 190). [5M]
B. Write an algorithm for in-order traversal of a binary tree. Explain with an example. [5M]

OR

16 A. Define Binary tree. Discuss on representations of Binary Trees. [5M]

B. Explain smart union algorithm with an example. [5M]

17 A. Insert the following list of elements into the hash table by using linear probing(size of hash table is 10) {45, 23, 47, 67, 89, 90, 54, 76} [5M]

B. Write a C++ function for binary search. [5M]

OR

18 A. Write a C++ function to perform Insertion sort. [5M]

B. Trace Quick sort for the following numbers 66, 5, 45, 36, 65, 15, 39, 66, 56, 55. [5M]

19 A. Explain BFS and its time complexity. [5M]

B. Explain delete operation in Binary Search tree. [5M]

OR

20 A. Discuss about representations of Graph. [5M]

B. Explain about insert operation in AVL tree. [5M]