R18 Regulation *Subject code:* 2P3FB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

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

DATA STRUCTURES

(Information Technology)

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 What is exception handling? Mention the sequence of events when an exception occurs?
2 Define Data structure? List the different types of data structures?
3 List any two advantages and two disadvantages of arrays?
4 Mentions the conditions to say **a)** circular queue is empty **b)** Linear queue is full?
5 Define binary search tree? Mention the different types of tree traversal techniques applied on binary search trees.
6 Define Max-heap?
7 Explain Hash function?
8 Define binary search?
9 Define graph? List any three applications of graphs?
10 What are the properties of Red-Black Trees?

Part-B

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

11 Discuss in detail about asymptotic notations. (10M)

OR

12 A. Distinguish between object and class? What is friend function? (5M)
B. What are the different forms of inheritance? Explain about single level inheritance with an example? (5M)

13 Develop the following expression A+ (B*C)-((D*E+F)/G) into postfix form. (10M)

OR

14 What is a doubly linked list? How to represent it? Discuss. (10M)

15 Build the max-heap for the following elements, and also show the heap (tree) after each of the element is inserted. Show the heap after deleting 8.
6, 14, 3, 26, 8, 18, 21, 9, 5. (10M)

OR

16 Design a function/routine for searching an element using binary search? (10M)

17 Execute Quick sort algorithm on the following data till four key values are placed in their position 13, 35, 46, 16, 5, 12, 9, 85, 15, 36, 89, 44, 22, 7. (select first element as pivot at each step) (10M)

OR

18 Illustrate with an example about how to sort the given elements using merge sort? (10M)

19 List and explain about the two different graph traversal techniques? (10M)

OR

20 Construct a B-tree of order 3 for the following elements {25, 10, 20, 30, 80, 40, 50, 60, 82, 70, 90, 85, 93}. Show the resultant B-tree after deleting 30 from the above constructed B-Tree. (10M)