Paper Id: 199359 **Roll No:** | | | | | | | | | | | | | |

B. TECH
(SEM III) THEORY EXAMINATION 2019-20
BASICS DATA STRUCTURE AND ALGORITHMS

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If required any missing data, then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x 10 = 20**

Qno.	Question	Marks	CO
a.	What is primitive data type?	2	CO1
b.	Define sparse matrix.	2	CO1
c.	What is PUSH and POP operation.	2	CO2
d.	What are two fields in Link list	2	CO2
e.	What is Binary Tree?	2	CO3
f.	What is AVL Tree.	2	CO3
g.	Explain Adjacency list for any graph	2	CO4
h.	Explain connected components	2	CO4
i.	What is unstable sorting?	2	CO4
j.	What is hoisting?	2	CO4

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

Qno.	Question	Marks	CO
a.	Explain asymptotic notations. Define Big-Oh notation and find the complexity of the following recursive function T(n) = 4T(n/2)+nlogn	10	CO1
b.	Show the addition of given polynomials using linked list: P=3X^2+2X+7 Q=5X^3+2X^2+X	10	CO2
c.	What is binary search tree? Make a binary search tree for following sequence: 8 7 17 25 23 6 9 2 15 22 12 1	10	CO3
d.	Differentiate between BFS and DFS with suitable example.	10	CO4
e.	What is stable sorting? Explain quick sort in detail.	10	CO4

SECTION C

3. Attempt any *one* part of the following: **1 x 10 = 10**

Qno.	Question	Marks	CO
a.	How do you find the complexity of an algorithm? What is the relation between the time and space complexities of an algorithm? Justify your answer with an example	10	CO1
b.	Define queue. Explain various operations performed on queue with suitable example	10	CO5

4. Attempt any *one* part of the following: **1 x 10 = 10**

Qno.	Question	Marks	CO
a.	What is recursion? Write a C code to solve tower of Hanoi problem.	10	CO2
b.	Write an algorithm for conversion of infix to postfix expression. Translate infix expression into its equivalent post fix expression: A * (B+D)/E-F * (G+H/I()	10	CO3

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5. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Draw a binary tree which following traversal: In order: DBHEAIF J CG Preorder: ABDEHCFIJG	10	CO4
b.	What is Threaded Binary Tree? Explain insertion and deletion algorithms on threaded binary trees	10	CO4

6. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Differentiate between Prims and Kruskal Algorithms with example.	10	CO2
b.	Write Short notes on: i) Walk ii) Path iii) Topological sort	10	CO2

7. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Explain merge sort. Discuss its worst-case time complexity.	10	CO4
b.	What is B-Tree? Differentiate between B-Tree & B+ Tree.	10	CO3