Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA Integrated - SEMESTER– III- EXAMINATION – WINTER 2018

Subject Code: 4430602 Date: 01-12-18

Subject Name: Data Structures

Time: 10.30 am to 1.00 pm Total Marks: 70

Instructions:

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

Q-1 (A) Do as directed:

1. List out applications of stack. **1**
2. Differentiate complete binary tree and full binary tree. **2**
3. Define Directed Graph. **1**
4. In binary tree total no.of.leaf nodes are _____. **1**
5. KWIC stands for _____. **1**
6. In _____ notation the operators precedes the two operands. **1**

(B) Do as directed:

1. Explain Spanning Tree with example. **2**
2. Draw Expression Tree for given Expression: **2**
   a*b+c*d/e
3. In circular queue implemented using an array holding 5 elements, if **FRONT=3** and **REAR=4**, then new element would get placed at _____ position. **1**
4. Define: Queue **1**
5. Define: Acyclic Graph **1**

Q-2 (A) Define Data Structure. Explain different categories of Data Structure. **7**

(B) To convert a given infix expression into postfix expression by using stack. **7**
A*(B+C^D)-E^F*(G/H)

OR

(B) Explain Tower of Hanoi problem of moving 3 discs. **7**

Q-3 (A) Generate Binary Tree from given Inorder and Postorder. And also find Preorder Traversal. **7**

Inorder: 3 7 8 6 11 2 5 4 9

Postorder: 3 8 11 6 7 4 9 5 2

(B) 1. Give Difference between static and dynamic memory allocation. **3**

2. Write an algorithm for following operation of Circular Queue. **4**
1) Insert an Element

OR

Q-3 (A) Write an algorithm to add two polynomials. **7**

(B) 1. Explain Row Major and Column Major Representation of 2-Dimensional Array. **3**

2. Draw B-Tree of order 3 for following data **4**
11,16,3,8,5,9,25,18,21,2,10

Q-4 (A) Demonstrate Quick Sort on the following set of Numbers. **7**
70 36 44 12 89 20 58 64 76 52

(B) Define Saprce Matrix. Explain Representation of Sparce Matrix with example. **7**

OR

Q-4 (A) Sort Following data using Heap Sort **7**
18, 25,38,12,8,22,48,39,72,36

(B) Define Searching. Write an algorithm for Binary Search. **7**

Q-5 (A) Explain Dijkstra's algorithm with example. **7**

(B) 1. Give difference Between BFS and DFS. **4**

2. Write a short note on Trie Structure. **3**

OR

Q-5 (A) Explain Kruskal's Alorithm with example. **7**

(B) What is Hashing? Explain Collision Resolution Techniques in detail. **7**

****