Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER– II EXAMINATION – SUMMER 2017

Subject Code: 2620001 Date: 31-05-2017

Subject Name: Data Structures

Time:10:30 am - 01:00 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)** Define the following terms **07**

1. Primitive data structure
2. m-ary Trees
3. Forest
4. Spanning tree
5. Sparse matrix
6. Null graph
7. Avl tree

(b) What is string? Explain any four the string handling functions. Write the applications of string **07**

Q.2 **(a)** What is stack? Write the algorithm for pop. Explain the applications of stack **07**

(b) Write the algorithm to convert infix to postfix and convert the following expression into postfix. **07**

A + B * C / D – E + F * G

OR

(b) Explain the storage structure of a two dimensional array **07**

Q.3 **(a)** What is a priority queue? Write the algorithm to insert and delete element from a priority queue. **07**

(b) What is a binary tree? How it is stored in memory? Explain the traversal technique in a binary tree. **07**

OR

Q.3 **(a)** What is a linked list? Write the algorithm to insert an element in a doubly linked list. **07**

(b) Differentiate BFS and DFS. Explain how it works with a suitable example **07**

Q.4 **(a)** Write the algorithm for quick sort and sort the following numbers according to it. **07**

25, 85, 60, 10,58, 47, 35, 16, 72,50

(b) What is heap? Demonstrate heap sort with a suitable example. **07**

OR

Q.4 **(a)** What is graph? Explain all the representation of graphs with suitable example. **07**

(b) Explain all the deletion processes in a binary tree with example. **07**

Q.5 **(a)** What is hashing? Explain the hashing functions with example. **07**

(b) What is a binary search tree? Create binary search tree for the following data. Write all the traversal order for the created tree
32,75, 48, 82, 68, 99, 87, 15 **07**

OR

Q.5 **(a)** Write and explain Dijkstra's algorithm for shortest path **07**

(b) What is complexity of an algorithm? Compare the algorithms of selection and merge sort using algorithm analysis technique. **07**

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