

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER-II • EXAMINATION – SUMMER • 2015

Subject Code: 2620001

Date: 28-05-2015

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) (1) Asymptotic notation **03**
(2) Storage representation of strings **02**
(3) Trie structures **02**
(b) Define singly linked list. Write the algorithm and explain the deletion operation on singly linked list **07**
- Q.2** (a) (1) Define queue. Explain the algorithm of insert operation in a circular queue with an example **05**
(2) What is simulation **02**
(b) Define stack. Explain the applications of stack. **07**
- OR**
- (b) Explain the row major and column major order representation of two dimensional array **07**
- Q.3** (a) Explain the traversal operations in a binary tree with an example. Write the algorithm for preorder traversal. **07**
(b) (1) What is a sparse matrix? Explain the sequential representation of sparse matrix. **04**
(2) Differentiate DFS and BFS **03**
- OR**
- Q.3** (a) Define spanning tree. Explain the Prim's and Kruskal's algorithm for minimum spanning tree with an example. **07**
(b) Define graph. Explain the different storage representations of graph. **07**
- Q.4** (a) Define a heap. Explain the creation of min heap and max heap for the following set of data [50,85,34,60,88] **07**
(b) Write short notes on
(1) M-ary tree **02**
(2) 2-3 trees **02**
(3) Avl tree **03**
- OR**
- Q.4** (a) Define binary tree? Explain the deletion operations in a binary search tree with an example **07**
(b) How can we represent a node in a doubly linked list? Explain the different insertion operations on a doubly linked list. **07**
- Q.5** (a) Write the algorithm for merge sort and sort the following numbers using merge sort [35,20,65,10,60,50,80,30,90,75]. **07**
(b) What is hashing ? Explain the hashing functions with example **07**
- OR**
- Q.5** (a) Write the algorithm for quick sort and sort the following numbers using quick sort [35,20,65,10,60,50,80,30,90,75]. **07**
(b) Compare the algorithms of insertion sort with bubble sort and obtain complexity of the best case, worst case and average case **07**
