

**GUJARAT TECHNOLOGICAL UNIVERSITY****B.E. Sem-III Examination December 2009****Subject code: 130702****Date: 19 /12 / 2009****Subject Name: Data & File Structure.****Time: 11.00 am – 1.30 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 data structure. List the various linear and non-linear data structures and explain them in brief. **05**
- (b) Discuss the basic operations performed with linear structure. **05**
- (c) What is recursion? Write a C program for GCD using recursion. **04**
- Q.2** (a) Write an algorithm to convert infix expression to postfix expression. **05**
- (b) Write an algorithm for evaluation of postfix expression and evaluation the following expression showing every status of stack in tabular form. **07**
- (i)  $5\ 4\ 6\ +\ * \ 4\ 9\ 3\ /\ +\ *$  (ii)  $7\ 5\ 2\ +\ * \ 4\ 1\ 1\ +\ /\ -$
- OR**
- (b) Trace the conversion of infix to postfix form in tabular form. **07**
- (i)  $(A + B * C / D - E + F / G / (H + I))$
- (ii)  $(A + B) * C + D / (B + A * C) + D$
- (c) Explain Difference between Stack and Queue. **02**
- Q.3** (a) Explain following: **06**
- (i) DQUEUE (ii) Priority Queue
- (iii) Circular Queue.
- (b) Write the implementation procedure of basic primitive operations of the stack using: **05**
- (i) Linear array (ii) linked list.
- (c) Consider the following arithmetic expression P, written in postfix notation. Translate it in infix notation and evaluate. **03**
- P:  $12, 7, 3, -, /, 2, 1, 5, +, *, +$
- OR**
- Q.3** (a) What is Hashing? Explain various Hashing Functions. **05**
- (b) Write the implementation procedure of basic primitive operations of the Queue using: **05**
- (i) Linear array (ii) linked list.
- (c) Discuss advantages and disadvantages of linked list over array. **04**
- Q.4** (a) Explain Sequential Files and Indexed Sequential Files Structures. **08**
- (b) Explain the Preorder, Inorder and Postorder traversal techniques of the binary tree with suitable example. **06**
- OR**
- Q.4** (a) Explain the terms: File, Field, Record, Database, Key. **06**

- (b) Which are the basic traversing techniques of the Graph? Write the algorithm of any one of them. **08**
- Q.5 (a)** Construct the AVL search tree by inserting the following elements in the order of their occurrence. **06**  
64, 1, 44, 26, 13, 110, 98, 85
- (b) Discuss following with reference to graphs. **08**  
(i) Directed graph (ii) Undirected graph (iii) Degree of vertex  
(iv) Null graph
- OR**
- Q.5 (a)** Explain matrix and linked list representation of a graph **06**
- (b) Discuss following with reference to trees. **08**  
(i) Height of the tree (ii) Binary tree (iii) Strictly binary tree  
(iv) Sibling

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