Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. Sem-III   Remedial Examination May 2011

Subject code: 130702   **Subject Name: Data and File Structure**
Date: 25-05-2011   **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 Algorithm. Write an algorithm to multiply two matrices. Also Perform Time Analysis for the same. **07**

(b) 1.Differentiate the following terms: [04] **07**
   a.   Liner and Non-Linear Data Structures
   b.   Primitive and Non-Primitive Data Structures
2. Explain Recursion with the help of an Example.   [03]

Q.2 **(a)** 1. Write down algorithms for performing push and pop operations on a stack.   [04] **07**
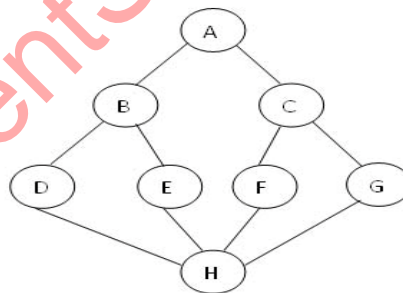2. Write an algorithm to convert parenthesized infix   expression to postfix.   [03]

(b) Write a Program to perform insert and delete operations on a circular Queue. **07**

OR

(b) 1. Compare the efficiencies of BFS and DFS.   [03] **07**
2. Give the DFS and BFS spanning tree for the graph given   below. [04]

Q.3 **(a)** 1. Write a function in any programming language to insert   an element in an ordered list.   [03] **07**
2. Write a program to count number of nodes in a linked   list. [04]

(b) Write a Program to perform all (create, insert, delete, display) the operations in a circular linked list. **07**

OR

Q.3 **(a)** 1. Write an algorithm to delete an element from a singly   linked list.   [03] **07**
2. State the advantages of circular and doubly linked lists   over a singly linked list.   [04]

(b) Write a Program to perform all (create, insert, delete, display) the operations in a doubly linked list. **07**

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Q.4 **(a)** 1. Define the following: [03] **07**
   1. Complete Binary Tree
   2. Almost Complete Binary Tree
2. Answer the following for the below given Graph. [04]
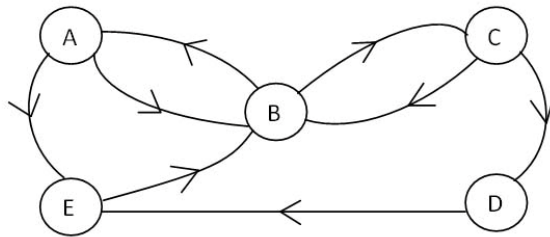
   1. What is the outdegree of node B.
   2. Write down a path from node D to node A.
   3. Is the above graph a multigraph? Give a reason for your answer.
   4. What is the total degree of node A.

(b) Write an algorithm to delete a node from a binary tree. **07**

OR

Q.4 **(a)** Write a program in any language to create a threaded binary tree. **07**
(b) Define an AVL tree. Obtain an AVL tree by inserting one integer at a time in the following sequence. **07**
150, 155, 160, 115, 110, 140, 120, 145, 130, 147, 170, 180.
Show all the steps.

Q.5 **(a)** What is hashing? Explain hash clash and its resolving techniques. **07**
(b) Define File and Record. Explain Indexed-Sequential File. Also discuss the advantages and disadvantages of the same. **07**

OR

Q.5 **(a)** Define Hash Clash. Explain Primary Clustering, secondary clustering, rehashing and double hashing. **07**
(b) State different File Organizations and discuss the advantages and disadvantages of each of them. **07**

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