

# GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-III Regular / Remedial Examination December 2010

Subject code: 130702

Subject Name: Data and File Structure

Date: 14 /12 /2010

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

14

- (a) What is sparse matrix? Explain
- (b) What does abstract data type means?
- (c) What is the difference between linear and nonlinear data structure.
- (d) Consider the following queue, where queue is a circular queue having 6 memory cells. Front=2, Rear=4  
Queue: \_, A, C, D, \_, \_  
Describe queue as following operation take place:  
F is added to the queue  
Two letters are deleted  
R is added to the queue  
S is added to the queue  
One letter is deleted
- (e) Give definition of a) Complete binary tree b) Height of tree
- (f) Give difference between recursion and iteration
- (g) What is 2-3 tree?

Q.2

- (a) Translate the following string into Polish notation and trace the content of stack  $(a + b \wedge c \wedge d) * (e + f / d)$  07
- (b) Write an algorithm which will check that the given string belongs to following grammar or not 05  
 $L = \{wcw^R \mid w \in \{a,b\}^*\}$  (Where  $w^R$  is the reverse of  $w$ )
- (c) Convert the following string into prefix : 02  
 $A-B/(C*D^E)$

OR

- (b) Write a function to implement insertion of an element in circular queue using link list. 05
- (c) Write an algorithm to change the  $i^{th}$  value of stack to value X 02

Q.3

- (a) Write a short note on threaded binary tree 04
- (b) Write an algorithm to insert an element into a singly link list 04
- (c) Write an algorithm to delete an element from a doubly link list 04
- (d) What is circular link list? 02

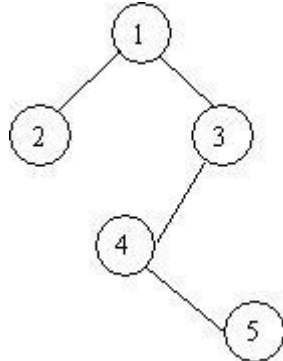
OR

- Q.3 (a) What is the meaning of height balanced tree? How rebalancing is done in height balanced tree. 04
- (b) Write a short note on doubly link list 04
- (c) Write an advantage of link list, doubly link list and circular link list 04
- (d) Explain priority queue 02

- Q.4** (a) Create a binary search tree for the following data : 06  
 50, 25, 75, 22, 40, 60, 80, 90, 15, 30
- (b) What is graph? How it can be represented using adjacency matrix, what is path matrix? How path matrix can be found out using adjacency matrix . 06
- (c) What is spanning tree ? 02

**OR**

- Q.4** (a) Give traversal order of following tree into inorder, preorder and postorder. 06



- (b) Explain BFS and DFS with example 06
- (c) Write warshall algorithm for graph. 02
- Q.5** (a) Explain various multiple key access file organization in brief with advantages and disadvantages of each method. 07
- (b) Explain hashing for direct files. 07
- OR**
- Q.5** (a) What do you mean by hashing? What are various hash function. Explain each one in brief. 07
- (b) List various fundamental file organization techniques and explain each in brief. 07

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