

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III EXAMINATION – SUMMER 2016

Subject Code:130702

Date:09/06/2016

Subject Name:Data and File Structure

Time:10:30 AM to 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) Give various applications of stack and queue. **06**
(b) What is a binary search tree? Explain with an example and state its applications. **05**
Also explain deletion in a binary search tree.
(c) Discuss the advantages and disadvantages of linked list over array. **03**
- Q.2** (a) Write a 'C' program to implement a stack. Do check for overflow and underflow. **07**
(b) What is hashing? Explain the collision resolution techniques. **07**
- OR**
- (b) Define recursion. What care should be taken in writing recursive function? **07**
Give a recursive solution for the problem of "Towers of Hanoi".
- Q.3** (a) Consider a circular queue of size 6. **07**
Let Front =2, Rear =4, and Queue : __, L, M, N, __, __
Describe the queue as following operations are performed.
1) Add O
2) Add P
3) Delete
4) Delete
5) Add Q, R, S
6) Delete
(b) What is importance of postfix notation? Write the algorithm for converting an infix expression to postfix notation. **07**
- OR**
- Q.3** (a) Convert the following expression to postfix notation. Show the contents of the stack while conversion. **07**
 $12 / (7 - 3) + 2 * (1 + 5)$
(b) What is a priority queue? Discuss the array implementation of priority queue. **07**
- Q.4** (a) Write an algorithm to insert a node before a given node in a singly linked list. **07**
Is it advantageous to use a doubly linked list for this operation? Explain.
- (b) Create a B-tree of order 5 by inserting the following data values. **07**
D, H, K, Z, B, P, Q, E, A, S, W, T, C, L, N, Y, M
- OR**
- Q.4** (a) What is an AVL tree? Explain the different types of rotations used to create an AVL tree with suitable examples. **07**
(b) Construct an expression tree for the following expression. **07**
 $A + (B + C * D + E) + F / G$.
Make a preorder traversal of the resultant tree.

- Q.5 (a)** A binary tree T has 9 nodes. The inorder and preorder traversals of T give the following sequence of nodes. **07**
Inorder: E A C K F H D B G
Preorder: F A E K C D H G B
Draw the tree T.
- (b)** What is a graph? Discuss the Adjacency Matrix and Adjacency List representation of graphs with an example. **07**

OR

- Q.5 (a)** Define the following with respect to a graph: **07**
1) Path 2) degree 3) Cycle 4) Spanning tree 5) Directed Graph
- (b)** Consider the following graph: Create a minimum spanning tree using the Kruskal's algorithm. **07**


