Seat No.: _____ Enrolment No._____

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. Also explain deletion in a binary search tree.	**05**
	(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? Give a recursive solution for the problem of "Towers of Hanoi".	**07**
Q.3	**(a)**	Consider a circular queue of size 6. 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	**07**
	(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. 12 / (7 - 3) + 2 * (1 + 5)	**07**
	(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. Is it advantageous to use a doubly linked list for this operation? Explain.	**07**
	(b)	Create a B-tree of order 5 by inserting the following data values. D, H, K, Z, B, P, Q, E, A, S, W, T, C, L, N, Y, M	**07**
		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. A+(B+C*D+E)+F/G. Make a preorder traversal of the resultant tree.	**07**

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.

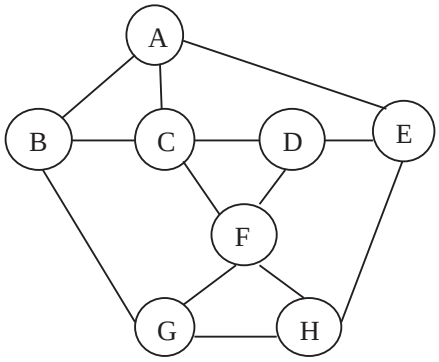
(b) What is a graph? Discuss the Adjacency Matrix and Adjacency List representation of graphs with an example. **07**

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**



****