No. of Printed Pages : 3 **BICS-007**

B.Tech. – VIEP – COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

00876 **Term-End Examination**

June, 2016

BICS-007 : DATA STRUCTURES

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks.*

1. (a) What is an array ? How are one-dimensional and two-dimensional arrays represented in memory ? 7

(b) What is a sparse matrix ? How can sparse matrices be represented efficiently in memory ? 7

2. (a) Write an efficient algorithm which converts in-fix expressions into post-fix expressions. 7

(b) What is a doubly linked list ? Explain the various operations on a doubly linked list with suitable algorithm. 7

3. (a) Write a 'C' program to implement a Queue using a linked list. 7

(b) Write short notes on the following : $3\frac{1}{2}+3\frac{1}{2}=7$

(i) Stack

(ii) Circular Queues

4. (a) A binary tree has nine nodes. Its Inorder and Preorder traversals' node sequences are :

Inorder :	E	A	C	K	F	H	D	B	G
Preorder :	F	A	E	K	C	D	H	G	B

Draw the tree. 5

(b) Explain the properties of a threaded binary tree. 4

(c) Prove that a binary tree with n leaves contains 2(n – 1) nodes. 5

5. (a) Discuss the methods of storing a graph in a computer. 7

(b) Explain depth first search techniques for graph traversal using suitable examples. 7

6. (a) Write a 'C' program to search a value in a stored array using binary search. 7

(b) Explain Hashing. Discuss the various Hash functions with examples. 7

7. (a) Write a program to sort the elements of an array using selection sort technique. 7

(b) Sort the following data using bubble sort technique : 7

44, 33, 11, 55, 22.

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Static and Dynamic Tree Table

(b) Hamiltonian Path

(c) Eulerian Path

(d) Planar Graphs and their application

(e) Time and Space Complexity

(f) Garbage Collection