

**B.Tech. – VIEP – COMPUTER SCIENCE AND
ENGINEERING (BTCSEVI)**

Term-End Examination

00408

December, 2016

BICS-007(S) : DATA STRUCTURES

Time : 3 hours

Maximum Marks : 70

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

1. (a) Write a program to merge two sorted arrays of dissimilar sizes. 7
(b) What is sparse matrix ? Why do we need it ? Explain with the help of an example. 7

2. Define a spanning tree. Write an algorithm to determine maximum spanning tree of a weighted graph. Also, argue for the correctness of your algorithm. Also determine the time complexity of the algorithm. Will an edge of highest cost always be in the solution obtained ? 14

3. (a) Convert the following infix arithmetic expression into post-fix form and show the status after every step : 7
$$(A + B) * C / D + EF / G$$
- (b) What do you mean by linked list ? Write down the algorithm for insertion at the beginning of a singly linked list. 7
4. (a) Write a short note on Garbage Collection and Compaction. 7
- (b) Write a program to delete a node in a double linked list. 7
5. (a) Write a program to sort an array of elements using quick sort algorithm. 7
- (b) What are the applications of the stack ? 7
6. (a) Define time complexity. Explain Big Oh (O) notation. 7
- (b) Write an algorithm to sort an array of elements using insertion sort. 7
7. (a) Explain Warshall's algorithm. 7
- (b) What is a Hash function ? Explain the different kinds of Hash functions. 7

8. Write short notes on any *two* of the following : $2 \times 7 = 14$

- (a) Hamiltonian Path and Circuit
 - (b) Huffman's Algorithm
 - (c) Tower of Hanoi Problem
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