Unit IV

7. Describe Warshall's algorithm to find the path matrix of a directed graph. Find the shortest distances between the modes of the graph whose weight matrix is as follows :

$$W = \begin{bmatrix} 7 & 5 & 0 & 0 \\ 7 & 0 & 0 & 2 \\ 0 & 3 & 0 & 0 \\ 4 & 0 & 1 & 0 \end{bmatrix}$$

8. (a) Explain BFS and DFS along with algorithms

    (b) Explain linked representation of graphs.

DD-312

M. Sc. EXAMINATION, May 2018

(Fourth Semester)

(Main & Re-appear)

MATHEMATICS

MAT604B

Data Structure

Time : 3 *Hours*]   [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Explain the concept of elementary data organisation.

(b) With the help of an example, explain the complexity of algorithms and time-space tradeoff.

2. Explain bubble sort along with its algorithm and apply it to sort the following numbers :

32, 51, 27, 85, 66, 23,13, 57

Unit II

**3.** (a) Describe linked list. Show by an example that the nodes of the list need not occupy adjacent elements in the arrays INFO and Link.

(b) How linked list may be searched ? Explain the algorithms for unsorted list.

4. (a) Explain linked representation of stacks. Also write its algorithm.

(b) Write the algorithm to quicksort an array A with N elemnens. Also discuss the complexity of this algorithm.

Unit III

5. (a) Explain the representation of binary trees in memory.

(b) Apply preoder traversal on the following binary tree :
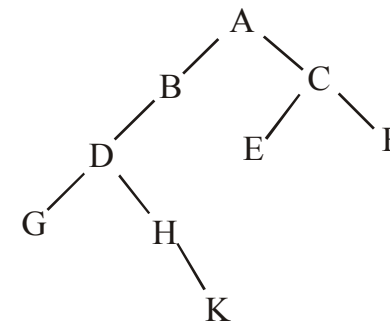
6. (a) Write the algorithm to find the location of an item in binary search tree and also the location of the parent of the item.

(b) Explain, how insertion can be done into a heap ? Also build a heap of the following numbers :

44, 30, 50, 22, 60, 55, 77, 55