2018

MCA 2nd Semester Examination

DATA STRUCTURE

PAPER—MCA-201

Subject Code—32

Full Marks : 100

Time : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer any *five* questions.

1. (a) What is sparse matrix ? How can we store sparse matrix in computer memory ?

(b) Write a C program to store a sparse matrix in memory.

(c) Write down the general formula for representing location of a 2D matrix in column-major form and row-major form. (2+3)+5+4

2. (a) Define queue with example.

(b) Write an algorithm to insert an element into the queue and delete an element from the queue. 2+(6+6)

3. (a) Write an algorithm to evaluate a postfix expression. Trace the same algorithm with stack contents for the following expression :

ABC + *CBA – + * with A = 1, B = 3, C = 5.

(b) Define AVL tree with an example. 10+4

4. Explain insertion sort with the following example (show step by step process) :

15 5 19 2 8 1 6 13 9 11. 14

5. (a) Write an algorithm to insert an element in doubly linked list.

(b) Write an algorithm to delete the last element from doubly linked list. 7+7

6. Write an algorithm to construct a binary search tree and check the duplicate data. Draw binary search tree constructed for the following input :

14, 3, 6, 2, 18, 20, 15, 18, 0, 23. 14

7. Write short notes on (any *two*) : 7+7

(a) Threaded binary tree (insertion, deletion).

(b) Circular queue (insertion, deletion).

(c) AVL tree (insertion, deletion).

(d) Polynomial Addition using linked list.

[Internal Assessment : 30 Marks]

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