0407

B. C. A. (Sem. III) Examination

October / November – 2005

303 - Data Structures

Time :   Hours]

[Total Marks : 70

Instructions :

(1)

(2)   Q **1** is **compulsory**.

(3)   Mention your options clearly.

(4)   Figures on the **right** indicate **full** marks.

(5)   This question paper contains 5 Question.

1   Answer the following :   14

  (a)   Distinguish between a user - defined function and one supplied in the library.

  (b)   Explain the meaning of function prototype, float fanel (float, int).

  (c)   Give storage representation of floating point numbers.

  (d)   What will be the location of element Aij in two dimensional array stored in row-major order ?

  (e)   Define Recursion.

  (f)   Give the reverse polish notation for the infix expression :

$$(a + b \uparrow c \uparrow d) * (e + f / d)$$

  (g)   Define event-driven simulation.

  (h)   Give best, average and worst case complexity of selection sort.

MP–0407]   1   [Contd..

(i) What is priority queue ?

(j) What is critical node in a height balanced tree ?

(k) Give linked list representation of the polynomial

$$5x^3 + 3x^2y^2 + 2xy + 4xy^2 + y^3$$

(l) Define linked dictionary.

(m) Define term :

    (i)   Data structure

    (ii) ARRAY.

2   (a) Write an algorithm to calculate factorial of a given number N recursively, which explicitly shows the recursive framework. Also trace the algorithm for N = 3.   **8**

   (b) What is Queue ? Explain different types of queues with example.   **6**

OR

2   (a) Write an algorithm to convert paranthesized infix expression into postfix and trace the algorithm for   **8**

$$(a + b \uparrow c \uparrow d) * (e + f / d)$$

   (b) Explain simulation with the general algorithm for event-driven simulation.   **6**

3   (a) What are various applications of linked list ? Write an algorithm to add two polynomials and trace it.   **8**

   (b) Write an algorithm to delete an element between two nodes in a circular linked list.   **6**

OR

3   (a) How a directed tree can be represented graphically in different ways ? Write an algorithm to convert general tree into binary tree.   **8**

   (b) Write an algorithm to traverse a binary tree in post order non-recursively.   **6**

4   (a) What are various search techniques ?
Write an algorithm for binary search into an array and trace the algorithm.   **6**

   (b) Write an algorithm to sort a given array using two-way merge sort and trace it.   **8**

OR

4 (a) Write the algorithm to create a differentiation tree for a given expression tree and trace the algorithm. 8

(b) Write an algorithm to sort a data array using bubble sort. 6

5 Write notes on : (any **four**) 14

(a) Symbol table

(b) Weight balanced tree

(c) Syntax analysis

(d) Stack machine

(e) Threaded binary tree

(f) Insertion sort.