2018

CBCS

3rd Semester

COMPUTER SCIENCE

PAPER—C5T

(Honours)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Data Structures

1. Answer any *five* questions : 5×2

(a) What do you mean by tail recursion ? Give example.

(b) What are the drawbacks of dynamic linked list over single linked list ?

(c) Define Best Case and Worst Case time complexity.

(d) What is the limitation of binary search ? What do you mean external sorting ?

(e) What is the purpose of stack in implementing a recursive procedure ? Explain.

(f) What is the need for usuing circular array to implement queues ?

(g) What an example explain the Huffman encoding scheme.

(h) The inorder and preorder traversal of a tree are given below. Construct the tree.

Inorder : D B M I N E A F C J G K

Preorder : A B D E I M N C F G J K

2. Answer any *four* questions : 4×5

(a) Consider a two dimensional array A of order [25 * 4]. The base address is 400, words per memory cell is 4. Find the address of A[12, 4] using row major and column major addressing. $2\frac{1}{2}+2\frac{1}{2}$

(b) Write an algorithm to insert a new element in given unsorted array at k-th position.

(c) (i) Convert the following infix expression to its equivalent prefix expression using stack :

$$A * (B - C / D) - E / F * G - H.$$

(ii) Define ADT (Abstract Data Type). 3+2

(d) Write an algorithm to convert an infix expression to its equivalent postfix expression.

(e) Write a non-recursive algorithm to traverse the tree element in INORDER traversal.

(f) Give a function that uses a stack in order to reverse the elements of a circular queue which is stored in an array.

3. Answer any *one* question : 1×10

(a) (i) To prove that $E = I + 2 * q$, where q is the number of internal nodes, I denotes internal path length and E denotes the external path length.

(ii) Why tree is called as a non-linear data structure ?

(iii) To construct a binary search tree using the following datas :

25, 57, 48, 37, 12, 92, 86, 33.

5+2+3

(b) Write an algorithm to sort an unsorted list using quick sort method. 10