Total number of printed pages–4

2017

DATA STRUCTURE

Paper : IT-304 (Back)

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* For the following set of elements :

    10, 4, 6, 19, 3, 8, 11, 18, 5

    Arrange them in ascending order using Bubble Sort algorithm.   10

   (b) Define data structure. What do you mean by ADT ? Define and differentiate between linear and non-linear data structures.   2+5+3

2. *(a)* Let LIST be the following sorted 15-elements array :

4, 11, 17, 22, 30, 44, 56, 67, 71, 79, 84, 88, 91, 94, 99

Using binary search algorithm find the number 26 and its position in the LIST and give the steps. 10

(b) Why do you have to check the full and empty conditions of a stack ? Write the algorithms to perform insertion and deletion in the stack. 4+6

3. *(a)* Suppose the following sequences list the nodes of a binary tree in preorder and inorder respectively.

Preorder : *G, B, Q, A, C, K, F, P, D, E, R, H.*

Inorder : *Q, B, K, C, F, A, G, P, E, D, H, R.*

Draw the diagram of the tree. 10

(b) What do you understand by a hashing function ? Calculate hash values of keys : 1892, 1921, 2007 and 3456 using different methods of hashing.
2+8

4. *(a)* Write a program to delete all the duplicate entries from a linked list of *n* integers. 10

(b) Write an algorithm to insert a node into a doubly linked list at various positions and explain them with examples.   10

5. *(a)* What is a threaded binary tree ? Explain with the help of example. What are its advantages ?   10

(b) Make a comparison between a linked list and a linear array. Which one will you prefer to use and when ? Explain with examples.   10

6. *(a)* How are pointers used to access one dimensional and two dimensional arrays ? Explain with example.   10

(b) Write a program to do the following :   10

(a) Create an array with seven elements

(b) Remove element at 3rd position

(c) Insert new element at 5th location

(d) Display the updated array.

7. Write short notes on : 20

   (a) Efficiency of an algorithm

   (b) Strictly binary tree

   (c) Complete binary tree

   (d) Extended binary tree.