2024

DATA STRUCTURE AND ALGORITHM

Paper : ITB–HC–2016

Full Marks : 60

Time : Three hours

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

*Answer **any six** questions.*

1. *(a)* Define two-dimensional array. Derive address translation function for two-dimensional array. 5

   (b) Define ADT. Draw a before and after diagram describing the main action of deleting a node from the middle position of a single linked list. 5

2. *(a)* What is a stack ? Describe the overflow and underflow condition of a stack. 5

(b) Write an algorithm for converting infix expression to postfix expression. Convert the following infix expression to postfix.

$$a+b*c/d+(e-f)/g$$ 5

3. (a) What is a Queue? What are the operations of queue? 5

(b) Describe circular queue. What are the advantages of circular queue over queue? 5

4. (a) Construct a binary tree using the following inorder and preorder traversal:

Inorder : E A C K F H D B G

Preorder : F A E K C D H G B 5

(b) What is binary search tree? Explain the different cases of deletion in binary search tree with example. 5

5. (a) Sort the following data using quick sort : 5

54, 26, 93, 17, 77, 31, 44, 55, 20

(b) Explain Heap sort algorithm. Construct a heap using the following numbers :

82, 90, 10, 12, 15, 77, 55 23 5

6. (a) Write a non-recursive algorithm to traverse a binary tree in Preorder. 5

(b) Describe the method of binary search technique with example. 5

7. (a) Explain what is graph traversal. What are the two types of graph traversal algorithm? Explain each of them. 5

(b) Write notes on : ***(any two)*** 2½×2=5

(i) Complexity of algorithm

(ii) Big O notation

(iii) Threaded binary tree

(iv) Merge sort