6651

B.C.A. IInd Semester Examination, 2023

DATA STRUCTURE USING C

Paper : BCA–204

Time : 3 Hours] [*M.M. : 70*

Note :– Answer any *five* questions. All questions carry equal marks.

1. Define Data structure. What are the factors that influence the choice of a particular data structure ? Also give the difference between linear and nonlinear data structure with suitable example of each.

2. What is doubly linked list ? What are the advantages and disadvantages of doubly linked list ? Also write an algorithm or function for :
   (i) insertion of a node in an existing singly list at the end
   (ii) deletion of a node in an existing singly list from the beginning
3. Discuss polish and reverse polish notation with a suitable example of each. Also convert the following infix expression to prefix and postfix expression :

   P*(Q–S)/T + V/(W+Y*Z)

4. Define recursive function. Differentiate between tail and non-tial recursive function. Also write a recursive function for generating *n*th element of a 'Fibonacci series'.
5. Differentiate between stack and queue data structure. Give array implementation of stack data structure. Write functions to implement Push and Pop operations on stack.

6. What do you mean by Binary Tree ? The order of nodes of a binary tree in in-order and post-order traversal are as follows :

In-order : B, I, D, A, C, G, E, H, F

Post-order : I, D, B, G, C, H, F, E, A

Draw the corresponding binary tree. Clearly show all steps.

7. Define Binary Search tree and AVL tree. What are the differences among them ? Explain your answer with suitable examples. Also make a binary search tree for the following sequence of numbers, show all steps :

41, 32, 94, 34, 66, 74, 12, 29, 39, 79, 25, 57

8. Explain different collision resolution techniques with suitable example of each. Also write an algorithm for Insertion Sort. Trace your algorithm on the following data to sort the list :

48, 77, 8, 10, 4, 94, 64, 36

9. How a graph is different from a tree ? Write and explain the breadth first search and depth first graph traversal algorithm. Explain with suitable example of each.

10. What is minimum spanning tree ? Draw the MST for the graph given below using Kruskal's algorithm and also find its cost. Show each step :