Bachelor of Science (B.Sc.) Semester-III (C.B.S.) Examination

COMPUTER SCIENCE (DATA STRUCTURES)

Paper—I

Time : Three Hours] [Maximum Marks : 50

N.B. :— ALL questions are compulsory and carry equal marks.

EITHER

1. (A) Write an algorithm to insert an element ITEM after element KEY in the double linked list. 5

(B) Explain the representation of linked list in memory. 5

OR

(C) Write an algorithm to delete the front element of linked list. 5

(D) Write an algorithm to add the two polynomials represented as a linked list. 5

EITHER

2. (A) Explain the quick sort method with suitable example. 5

(B) What is a stack ? Explain its memory representation. Write an algorithm to insert element in stack. 5

OR

(C) Write an algorithm for translating the infix expression into postfix notation. 5

(D) Let M and N be integers and suppose F(M, N) is recursively defined by :

$$F(M, N) = \begin{cases} 1 \text{ if } M = 0 \text{ or } M > N \geq 1 \\ F(M-1, N) + F(M-1, N-1) \text{ otherwise} \end{cases}$$

Find F(4,2) and F(2, 4). 5

EITHER

3. (A) Write on algorithm to delete the element from circular queue. 5

(B) Explain insertion sort method with a suitable example. 5

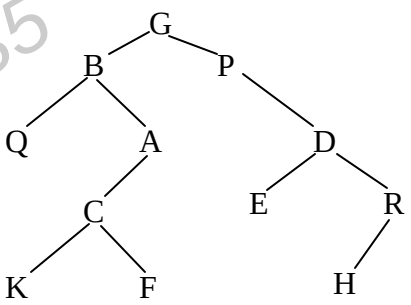
OR

(C) Write an algorithm for selection sort method. 5

(D) What is priority queue ? Explain the array representation of priority queue in memory. 5

EITHER

4. (A) Traverse the following tree in preorder and postorder. 5



(B) Write an algorithm for Depth first search of graph. 5

OR

(C) What is graph ? Give its memory representation as an array and linked list. 5

(D) Write an algorithm for the inorder traversal of a binary tree. 5

5. Attempt **ALL** :

(A) Define circular linked list. 2½

(B) Explain the overflow and underflow condition in array representation of stack. 2½

(C) Discuss the complexity of selection sort method. 2½

(D) Give the adjacency matrix for the following graph. 2½