Bachelor of Science (B.Sc.) (I.T.) Semester–III Examination
DATA STRUCTURES
Paper—II

Time : Three Hours] [Maximum Marks : 50

Note :— (1) All questions are compulsory and carry equal marks.
(2) Illustrate your answer with suitable diagrams wherever necessary.

EITHER

1. (A) What is Linked List ? Explain the representation of Linked List in Memory. 5
(B) Write an algorithm to insert an element at the end of single linked list. 5

OR

(C) Write an algorithm to delete last node from double linked list. 5
(D) Define double linked list. Explain the representation of double linked list in memory. 5

EITHER

2. (A) Write an algorithm to convert Infix Expression to Postfix Expression. 5
(B) Let A be an integer Array with N elements. Suppose X is an integer function defined by

$$X(K) = X(A, N, K) = \begin{cases} 0, & \text{if } K = 0 \\ X(K-1) + A(K), & \text{if } 0 < K \le N \\ X(K-1), & \text{if } K > N \end{cases}$$

Find X(5) for each of the following array :
(i) N = 8, A : 3, 7, –2, 5, 6, – 4, 2, 7
(ii) N = 3, A : 2, 7, –4. 5

OR

(C) What is Stack ? Write an algorithm for PUSH and POP operation on STACK. 5
(D) Convert the following expression to prefix and postfix form :
(i) ((A + B) $\wedge$ C – (D $*$ E)/F)
(ii) x^{y^z}. 5

EITHER

3. (A) Explain Dequeue and Priority Queue. 5
(B) Write an algorithm for selection sort and give its complexity. 5

OR

(C) Explain different methods for hashing technique. 5
(D) Write an algorithm to insert an element in a circular queue. 5

EITHER

4. (A) Write an algorithm for preorder traversing of Binary tree. 5
(B) Explain representation of Graph in memory using linked representation. 5

OR

(C) What is Binary Tree ? Explain representation of Binary Tree in memory. 5
(D) Explain DFS traversal method of Graph. 5

5. (A) What is underflow and overflow situation in Linked List ? 2½
(B) Discuss Tower of Hanoi Problem. 2½
(C) Explain Big-O Notations. 2½
(D) Explain binary search tree in brief. 2½