Third Semester B. Sc. Examination

COMPUTER SCIENCE

Paper - I

(Data Structures)

Time : Three Hours] [Max. Marks : 50

N. B. : All questions are compulsory and carry equal marks.

EITHER

1. (A) Write an algorithm to delete the last node from single linked list. 5

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

OR

   (C) Write an algorithm to count the number of nodes in linked list. 5

   (D) Write an algorithm to insert the element at the begining of double linked list. 5

EITHER

2. (A) Write an algorithm to convert the given infix expression into postfix form. 5

   (B) Explain the Towers of Hanoi problem. 5

OR

(C) Translate the following infix expression into prefix and postfix expression.

(i) A + (B * D/E) * (F + G/H) * k

(ii) (A + B)^C – (D * E)/ F 5

(D) Write an algorithm to insert and delete element from stack. 5

EITHER

3. (A) Explain insertion sort method with suitable example. 5

(B) Write an algorithm to insert element in Circular queue. 5

OR

(C) Explain the array and linked representation of priority queue. 5

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

EITHER

4. (A) Explain the representation of binary trees in memory.

(B) Draw the graph for the following adjacency matrix.

$$\begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$$ 5

OR

(C) Given

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

Inorder ; F, A, E, K, C, D, H, G, B

Draw the tree. 5

(D) Explain the array representation of Graph in memory. 5

5. Solve any **ten** :—

(a) Explain the underflow condition in linked list.

(b) What is the header node ?

(c) What is circular linked list ?

(d) Define stack.

(e) What is recursion ?

(f) What is the overflow condition in stack ?

(g) What is dequeue ?

(h) Give the complexity of insertion sort method.

(i) What is hashing ?

(j) Define complete binary tree.

(k) Define directed graph.

(l) What is heap ? 10