Bachelor of Computer Application (B.C.A.) Semester-III (C.B.S.) Examination

DATA STRUCTURES

Paper—III

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **All** questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagram wherever necessary.

EITHER

1. (A) Explain two way linked list. What are the advantages of two way linked list over single linked list ? 5

(B) Write an algorithm to delete the last node of single linked list. 5

OR

(C) Write an algorithm to insert the node at the beginning of linked list. 5

(D) Write an algorithm to count the even integers in the linked list of integers. 5

EITHER

2. (A) Write an algorithm to insert and remove the element from stack. 5

(B) Translate the following infix expression into prefix and postfix form :

(i) $\dfrac{A^{B^{C^D}}}{W^{X^{Y^Z}}}$

(ii) $C * a^x - b^x * d$ 5

OR

(C) Write an algorithm to evaluate the postfix expression. 5

(D) Let J and K be integers and Q(J, K) is recursively defined by

$$Q(J, K) = \begin{cases} 5 \text{ if } J < K \\ Q(J - K, K + 2) + J \text{ if } J > K \end{cases}$$

Find Q(2, 7), Q(5, 3) and Q(12, 2). 5

EITHER

3. (A) Write an algorithm to insert an element in a linear queue. 5

(B) What is circular queue ? Explain the overflow and underflow condition in array representation of circular queue. 5

OR

(C) Write an algorithm to remove the element from circular queue. 5

(D) Explain selection sort method with suitable example. 5

EITHER

4. (A) Following is the Inorder and Postorder traversal of binary tree :

Inorder : $n_1, n_2, n_3, n_4, n_5, n_6, n_7, n_8, n_9$

Postorder : $n_1, n_3, n_5, n_4, n_2, n_8, n_7, n_9, n_6$.

Draw the tree. 5

(B) Explain BFS method of traversing graph with suitable example. 5

OR

(C) Write an algorithm for the postorder traversal of binary tree. 5

(D) 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

5. Attempt **all** :

(A) Define circular double linked list. 2½

(B) Explain recursion. What is the base criteria in the recursion ? 2½

(C) Explain dequeue. 2½

(D) Define complete graph. 2½