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

DATA STRUCTURES

Paper—II

Time : Three Hours] [Maximum Marks : 50

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

EITHER

1. (a) What is double link list ? Explain memory representation of double link list. 5
(b) Write an algorithm to insert the element at front of link list. 5

OR

(c) Write an algorithm to merge two single linked lists. 5
(d) Write an algorithm to search ITEM from link list. 5

EITHER

2. (a) Consider the postfix expression :
P : 12, 7, 3, –, /, 2, 1, 5, +, *, +
Evaluate the expression. 5
(b) Explain Quick-sort method with suitable example. 5

OR

(c) Let A, B be non-negative integers suppose a function GCD is recursively defined :

$$GCD(A, B) = \begin{bmatrix} GCD\ (B, A) & \text{If } A < B \\ A & \text{If } B = O \\ GCD\ (B, MOD\ (A, B)) & \text{Otherwise} \end{bmatrix}$$

find GCD (540, 168). 5
(d) Write an algorithm to evaluate the postfix expression. 5

EITHER

3. (a) What is Queue ? Explain array representation of Queue in memory. 5
(b) Consider the following 4-digit employee numbers :
9614, 5882, 6713, 4409, 1825 find 2 digit hash address using folding method. 5

OR

(c) What is Priority Queue ? Explain different ways of maintaining a Priority Queue in memory. 5
(d) Write an algorithm for selection sort. 5

EITHER

4. (a) Explain DFS traversal method of graph. 5
(b) A binary tree T has 12 nodes, the Preorder and Inorder traversal of T :
Preorder : D, B, H, E, A, I, F, J, C, G
Inorder : A, B, D, E, H, C, F, I, J, G
Draw the tree T. 5

OR

(c) Explain BFS traversal method of graph. 5
(d) Suppose the following eight numbers are inserted in order into an empty Binary search tree T : 50, 33, 44, 22, 77, 35, 60, 40
Draw the tree T. 5

5. Attempt all :
(a) Define double link list. 2½
(b) What is recursion ? Write recursive algorithm to find factorial of an integer N. 2½
(c) Explain Big-O notation. 2½
(d) Explain weighted graph and complete graph with example. 2½