(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 1 7 9 3 2

Exam. Code : 0 0 2 9

Bachelor of Computer Applications 3rd Semester

(2124)

DATA STRUCTURES

Paper : BCA-16-305

Time Allowed : Three Hours] **[Maximum Marks : 65**

Note :— Attempt ***five*** questions in all by selecting ***one*** question from each unit. Entire Question Number IX is compulsory.

UNIT—I

I. (a) What is Data Structure ? Describe the basic operations of Data Structure.

(b) What is an Array ? Differentiate between row major and column major representation of 2D Array in memory. 7,6

II. (a) Write algorithms to insert and delete elements in a Linear Array.

(b) What is a Stack ? How is it represented in memory ? Name few applications of Stack. 7,6

UNIT—II

III. (a) Write an algorithm to insert a new node at the beginning of a Linked List.

(b) Write an algorithm to search an element from a Linked List. 7,6

IV. (a) Describe Doubly Linked List. Write an algorithm to traverse a Doubly Linked List.

(b) Describe Circular Linked List. Write an algorithm to delete an item from a Circular Linked List. 7,6

UNIT—III

V. (a) What is a Binary Tree ? How is it different from a Binary Search Tree ? Explain with examples.

(b) Write down the algorithm for inorder traversal of binary tree. 7,6

VI. (a) Explain the main terminology of Graph. How is a Graph represented in memory ?

(b) Explain Depth First Search algorithm with suitable example. 7,6

UNIT—IV

VII. (a) What is linear search ? Explain with an example. Also explain the best case and worst case of linear search.

(b) What is Binary Search ? Write all stages of searching an item 55 in the data list-33, 77, 88, 44, 22, 55, 11, 99. 7,6

VIII.(a) Explain steps for sorting the data list-13, 71, 82, 24, 52, 75, 11, 89 using Quick Sort procedure.

(b) How does Merge Sort algorithm work ? Explain it with an example. 7,6

(Compulsory Question)

IX. Write short answers :

(i) What is Time complexity ?

(ii) List any two applications of Queue.

(iii) Differentiate between linear and non-linear data structures.

(iv) What are the drawbacks of using Linked List ?

(v) How do you find the height of a node in a Tree ?

(vi) Name any four algorithms which work on Divide and Conquer Principle.

(vii) Describe the complexity of Bubble Sort. 6×2+1=13