

(i) Printed Pages : 3

Roll No. ....

(ii) Questions : 9

Sub. Code :

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Bachelor of Computer Applications 3<sup>rd</sup> 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.  $6 \times 2 + 1 = 13$