Total No. of Questions—**5**]                    [Total No. of Printed Pages—**2**

Seat
No.

**[4968]-3002**

B.C.A. (Semester–III) EXAMINATION, 2016
302 : DATA STRUCTURE USING C++
(2013 PATTERN)

**Time : 3 Hours**                                **Maximum Marks : 80**

*N.B.* :— (*i*)  *All* questions are compulsory.
        (*ii*)  *All* questions carry equal marks.
        (*iii*)  Assume suitable data, if necessary.

**1.**  Attempt any *eight* of the following :                    [8×2=16]
   (*a*)  What is Data Structure ?
   (*b*)  What is Ancestor of Node ?
   (*c*)  What are the operations we can perform on to the queue ?
   (*d*)  Differentiate between array and structure.
   (*e*)  What is Big-O notation ?
   (*f*)  When multiplication of two polynomials is possible ?
   (*g*)  What is strongly connected graph ?
   (*h*)  Give the formulae for address calculation for row and column major representation ?
   (*i*)  How to measure performance of an algorithm ?
   (*j*)  What is indegree and outdegree of node in a graph ?

**2.**  Attempt any *four* of the following :                    [4×4=16]
   (*a*)  Explain BFS traversing technique with an example.
   (*b*)  Explain Heap Sort technique with an example.
   (*c*)  Write a function to sort given singly linked list.
   (*d*)  Write a function to reverse a given string by using stack.
   (*e*)  Write a program for addition of two polynomials.

**3.** Attempt any *four* of the following : [4×4=16]

(a) Write a function to traverse a graph by using DFS.

(b) Explain Height balance tree with an example.

(c) Explain graph representation techniques with an example.

(d) Sort the following data by using selection sort technique : 56, 23, 2, 78, 122, 89, 43, 1

(e) Write a function to reverse singly linked list.

**4.** Attempt any *four* of the following : [4×4=16]

(a) Explain Prim's algorithm for minimal spanning tree.

(b) Write a function to calculate average of elements of nodes in singly linked list.
(e.g. (value of first Node + value of second node +.......)/ Number of nodes)

(c) Write a function to create and display circular singly linked list.

(d) Explain different types of recursive tree traversing technique with an example.

(e) What is an algorithm ? Explain its characteristics in detail.

**5.** Attempt any *four* of the following : [4×4=16]

(a) Write function to remove last node of singly linked list and add it at the beginning of list.

(b) Write a function to create doubly linked list and display it.

(c) Explain Quick Sort with an example.

(d) Write an algorithm for evaluation of postifix expression.

(e) What is circular queue ? Explain it with an example.