Roll No. ....

BCA–302(N)

B. C. A. (Third Semester)
EXAMINATION, Dec., 2016

(New Course)

Paper Second

DATA STRUCTURE USING C AND C++

Time : Three Hours] [*Maximum Marks : 75*

Note : Attempt questions from all Sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section—A

(Short Answer Type Questions)

Note : Attempt all questions from this Section. Each question carries 3 marks.

1. (A) Explain the different operations related to data structure.

   (B) What are sparse matrices ?

   (C) Write a program to find whether the given matrix is lower left matrix or not.

   (D) Convert the following infix expression to postfix :

   $x - y / (q \wedge p) + (u * v)$

   (E) What is D-queue ? Explain its structure.

   (F) Write an algorithm to insert and delete a node from doubly linked list.

   (G) Define tree. How a tree can be stored in memory ?

   (H) What is B-tree ? How can we insert an element in B-tree ?

   (I) How does the merge sort work ? Explain.

Section—B

(Long Answer Type Questions)

Note : Attempt any *two* questions. Each question carries 12 marks.

2. (a) How two-dimensional arrays are represented in memory ? Also obtain the formula for calculating the address of any element stored in array, in case of column major order.

   (b) Write a C/C++ program to find locations of a sub-string in a given string.

3. (a) What is polish notation and reverse polish notation ? Explain with examples.

   (b) Write an algorithm to convert infix expression into postfix form. Convert the following expression into postfix form using stack :

   $z + (y * x - (w / v \wedge u) * t) * s$

4. (a) Why are circular queues better than simple queue ? Write an algorithm to insert and delete an item from the circular queue.

(b) What do you understand by priority queue ? Write a function in C/C++ language to insert an element in a porioty queue.

5. (a) Write a C/C++ function for inserting and deleting a node from a doubly linked list.

(b) How can we represent a polynomial in linked list ? Write an algorithm to add two polynomials represented by linked lists.

Section—C

(Long Answer Type Questions)

Note : Attempt any *two* questions. Each question carries 12 marks.

6. (a) Define Binary tree. Explain the linear sequential representation of binary tree. Write advantages and disadvantages of sequential representation of binary tree.

(b) Write a C/C++ function for inorder and post-order traversal of a binary tree.

7. (a) Write the function in C/C++ to insert and delete a node in an existing binary search tree.

(a) Construct a binary tree for the following data :

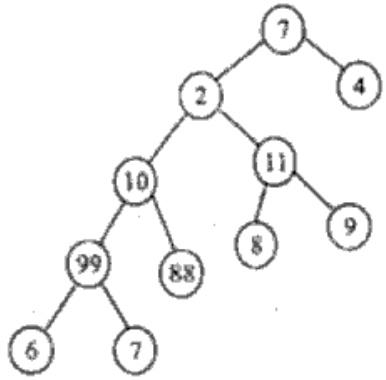
(i) Inorder : F E A C D G H B I

(ii) Postorder : E F C D H I B G A

8. (a) Show that the B tree that results when inserting R, Y, F, X, A, M, C, D, E, T, H, V, L, W, G (in that order) branching factor of $t = 3$. Only draw the trees just before and after each split.

(b) Write an algorithm to convert a forest into a binary tree.

9. (a) Dose the tree represent a heap or not ? Explain.



(b) What is Hashing ? How to determine the location of the element in an array using hash function ? Explain with example.

(c) Create Heap for the list of elements :

Index	Values
1	97
2	22
3	43
4	100
5	34
6	97
7	81
8	10
9	44
10	41

2900