

Roll No. ....

# BCA-302(N)

## B. C. A. (Third Semester) EXAMINATION, Dec., 2014

(New Course)

Paper Second

DATA STRUCTURE USING C AND C++

Time : Three Hours ]

[ Maximum Marks : 75

Note : Section A is compulsory. Attempt any seven questions from Section B and any one question from Section C.

### Section—A

9 each

1. (a) List out and define performance measures of an algorithm. 2
- (b) Define the terms node , address, null pointer and next pointer for a linked list. 2
- (c) What is recursion and explain with an example. 2
- (d) State different ways of traversing a binary tree. 2
2. (a) State algorithm technique used in merge sort. 1
- (b) What is the worst case complexity of quick sort? 1
- (c) Arrange the given array using bubble sort : 3

{12, 4, 5, 10, 1}

- (d) List some applications of graph. 2
- (e) Prove that the number of odd degree vertices in a connected graph should be even. 3

**Section—B**

6 each

3. Convert the given infix expression to postfix expression using stack and show details of stack at each step of conversion.  
 expression  $(a + b * c \wedge d) * (e + f/g)$  where  $\wedge$  denotes exponential operator.
4. Write an algorithm for insertion and deletion of an element into a circular queue.
5. Give the algorithm for quick sort and explain its time complexity. Trace the algorithm for the following data :

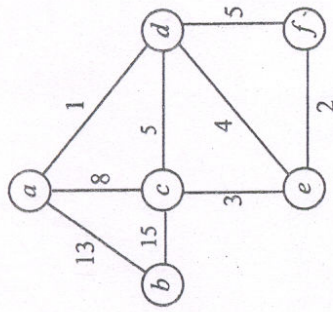
65, 70, 75, 80, 85, 60, 55, 50, 45

6. What is garbage collection ? How is it implemented practically ? Explain.
7. (a) Write a routine to sort  $n$  elements in increasing order using Heap sort.
- (b) Sort 3, 1, 4, 1, 5, 9, 2, 6 using Heap sort in descending order.
8. Give the best case and worst case analysis of binary search.
9. Implement typical stack operation when stacks are represented using singly linked list.
10. Design an algorithm which trims off all the trailing blanks in a character string.
11. Give an iterative algorithm for inorder traversal of a binary tree.

**Section—C**

15 each

12. (a) Find the minimum cost spanning tree for the following weighted graph.



- (b) Explain DFS with example.

13. (a) Classify the hashing functions and explain each with an example.
- (b) For the tree perform inorder and postorder traversal :

