Roll No. .....

BCA–302(N)

B. C. A. (Third Semester)
EXAMINATION, Dec., 2013

(New Course)

Paper Second

DATA STRUCTURE USING C & 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
(Numerical/Analytical/Problematic Questions)

1. (a) Find the postfix form of the following infix notation :
$(A + B) * (C * D - E) * F.$ 4

(b) Evaluate the following postfix expression : 4
5, 7, 9, *, +, 4, 9, 3, 1, +, –

(c) Explain the application of stack in recursive function with example. 4

2. (a) Find the number of edges of a complete binary tree with 15 nodes. 1

(b) What is the time complexity of Insertion sort in average case ? 1

(c) List the complexity of creating a heap of size n. 1

(d) Find the maximum number of nodes in a binary tree of depth 5. 1

(e) Explain the term Front and Rear for queue. 1

(f) List the data structure where elements can be added or removed at either end but not in the middle. 1

Section—B

(Short Answer Type Questions)

3. Write an algorithm to insert new node at the beginning, at the middle and at the end of a singly linked list. 6

4. Construct a Binary Search Tree from the given values. Consider the first value as the root value.

Values : 6

45, 23, 29, 85, 92, 7, 11, 35, 49, 51

5. What is Hashing ? Give its significance. 6

6. Compare Quick Sort and Merge Sort with respect to advantages and disadvantages. 6

7. (a) Explain the concept of priority queue with suitable example. 3

(b) Write an algorithm to insert an element in a stack. 3

8. Describe the terms related to Binary Tree : 6

Level, Depth, Leaf Node, Sibling, Height and Root Node

9. Write an algorithm for Binary Search. What are the conditions under which sequential search of a list is preferred over binary search ? 6

10. (a) Give Mathematical recursive definition of an AVL tree. 3

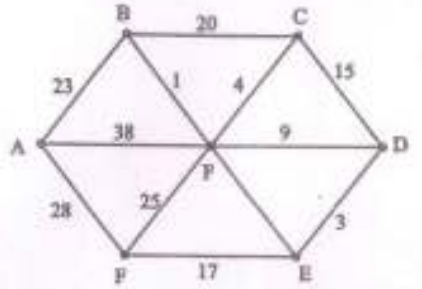
(b) Define B-tree of order m. When is it preferred to use B-trees ? 3

11. Transform the array 2, 8, 6, 1, 10, 15, 3, 12, 11 into a heap with a bottom up method. 6

Section—C

(Long Answer Type Questions)

12. Consider the following undirected graph :



Answer any *three* of the following : 5 each

(i) Find the adjacency list representation of the graph.

(ii) Find a BFS tree starting at A.

(iii) Find a DFS tree starting at A

(iv) Find a minimum cost spanning tree by Kruskal's algorithm.

13. (a) Construct an expression tree for the expression $(-b + \sqrt{b^2 - 4ac})/2 * a$. Show all steps. 6

(b) Find pre-order, in-order and post-order traversals of the expression tree formed above in 13 (a). 9