Seat No. : _____

ND-148

December-2015

S.Y. M.Sc., (CA & IT)

Data Structures

Time : 3 Hours] **[Max. Marks : 100**

1. (a) Write an algorithm for PUSH operation of stack. **6**

   (b) Convert the following expressions from infix to postfix : **9**

   (i) A * (B + C – D / E) / F

   (ii) P * Q + (R – S / T)

   (iii) ((A + B) / D) – ((E – F) * G

   (c) Write an algorithm for evaluating a postfix expression. **5**

2. (a) Consider the following simple queue where 6 memory cells are allocated : **5**

   Front = 3 Rear = 5

   Queue : _, _, P, Q, R, _

   Describe the queue including front and rear as the following operations takes place :

   (1) Z is added

   (2) Delete

   (3) Delete

   (4) Delete

   (5) A is added

   (b) Write an algorithm for the following : (any **three**) **15**

   (1) Insert a node after a given location LOC is simple linked list.

   (2) Check whether an element is present in circular liked list or not.

   (3) Delete a given location LOC in two ways linked list.

   (4) Count the total number of nodes having value greater than 50.

3. (a) Create a binary tree from the given traversals : **5**

   Inorder : Y T Z S P Q U R V W X

   Preorder : Q P S T Y Z R U V W X

(b) Define the following with respect to tree : (any **5**) **10**

(1) AVL Tree

(2) Leaf Node

(3) Indegree of a node

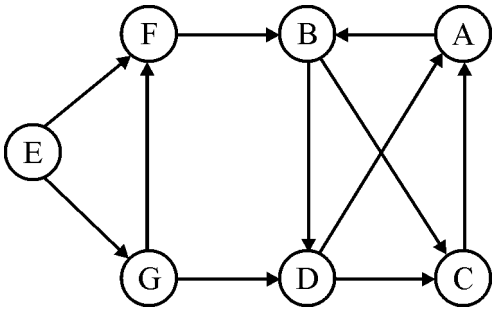
(4) Complete Binary Tree

(5) Similar Trees

(6) Binary Search Trees

(c) Write an algorithm for searching a given item of information in binary search tree. **5**

4. (a) Find adjacency and path matrix for the following graph : **6**



(b) Define the following with respect to graph : **10**

(1) Simple path

(2) Endpoints

(3) Connected graph

(4) Loops

(5) Complete graph

(c) Explain minimum spanning tree and Kruskal's algorithm. **4**

5. (a) Answer any **four** : **20**

(1) Perform bubble sort for the following numbers :

65, 87, 12, 90, 33, 58, 15, 72, 44

(2) Write an algorithm for insertion sort.

(3) Sort the following numbers using radix sort :

561, 789, 235, 874, 512, 370, 261, 629, 416, 147

(4) Write an algorithm for merge sort.

(5) Write an algorithm for sequential search.

———————