Seat No. : _____

TN-112

B.C.A. Sem. III

May-2013

CC-202 : Data Structures

Time : 3 Hours] **[Max. Marks : 70**

1. (A) (1) What is Data structure ? Explain different types of data structure. **4**
   (2) Difference between Singly Linked List and Doubly Linked List. **3**

   OR

   (1) What is linked list ? Write down advantages and disadvantages of linked list. **4**
   (2) Write an algorithm to delete an element from beginning from Doubly Linked List. **3**

   (B) (1) Write an algorithm for Bubble sort. **4**
   (2) Write an algorithm for Linear Search. **3**

   OR

   (1) Write an algorithm for Binary Search. **4**
   (2) Sort the following data using Selection sort : **3**
   75 3 85 26 96 99 40

2. (A) (1) Convert the following infix expression into postfix expression using stack : **5**
   A - (B / C + (D % E * F) / G) * H
   (2) Write an algorithm for PUSH operation. **2**

   OR

   (1) Convert the following infix expression into prefix form by using manual method. **5**
   (A – B) * (E + G) / (C + D) ^ (F – H)
   (2) Write an algorithm for PEEP operation. **2**

   (B) (1) Write an algorithm for insert and deletion operation in a simple queue. **4**
   (2) Trace the simple queue of the following operations. If front = 1 and rear = 3 and size of queue is 5. **3**
   (i) ENQUEUE(P) (ii) ENQUEUE(Q) (iii) DEQUEUE
   (iv) ENQUEUE(R) (v) DEQUEUE (vi) ENQUEUE(S)

   OR

   (1) Explain types of a queue. **4**
   (2) What is the problem of simple queue ? How it can be overcome ? **3**

3. (A) (1) Explain AVL tree. **4**
   (2) Define the following : **3**
   (i) Tree
   (ii) Leaf node
   (iii) Complete binary tree

   OR

(1) Create the Max heap from the following data. **4**

45 36 54 27 63 72 61 18

(2) Write down algorithm for in-order traversal and pre-order traversal. **3**

(B) (1) Write an algorithm for insertion in Binary Search Tree. **4**

(2) Create an expression tree from the following expression. **3**

((A + B) – (C * D)) % ((E ^ F) / (G-H))

OR

(1) Create binary tree from the following traversal : **4**

In-order : 9, 18, 27, 39, 45, 54, 63, 72, 90, 99.

Pre-order : 72, 54, 39, 9, 27, 18, 45, 63, 90, 99.

(2) Create the binary search tree from the following data : **3**

58, 25, 60, 59, 20, 38, 40, 1, 90.

4. (A) (1) Define the following : **4**

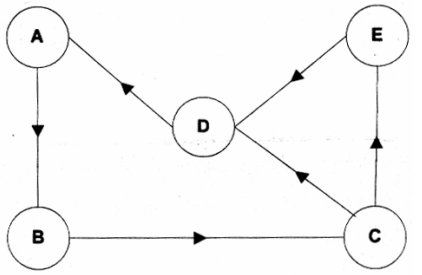
(i) Degree

(ii) Isolated vertex

(iii) Multiple edge

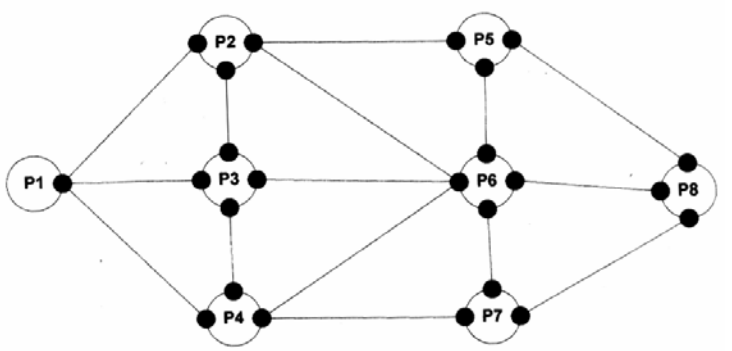
(iv) Disconnected Graph

(2) From the given graph, shows its adjacency matrix representation. **3**



OR

(1) From the given graph, show its DFS and DFS traversal. **4**



(2) Write down the Prim's algorithm. **3**

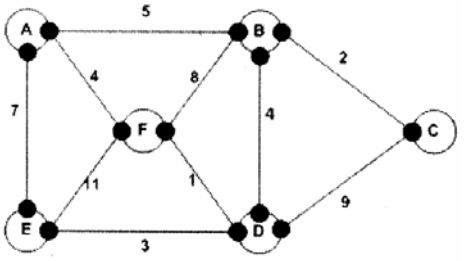
(B) (1) Construct a graph from the following adjacency matrix. And also show the Adjacency List from the same graph. **4**

	A	**B**	**C**	**D**	**E**
A	0	1	0	1	1
B	1	0	1	1	0
C	0	1	0	1	1
D	1	1	1	0	1
E	1	0	1	1	0

(2) Define spanning tree. What is the use of minimum spanning tree ? **3**

OR

(1) Draw the minimum cost spanning tree from the following weighted graph using Kruskal's algorithm. And find the cost of that spanning tree. **4**



(2) Define the following : **3**

(i) Out-degree of a vertex

(ii) Path

(iii) Complete graph

5. Attempt any Fourteen : **14**

(1) Define Similar Binary Tree.

(2) In a queue, insertion is done at _____.

(a) Rear (b) Front

(c) Back (d) Top

(3) Degree of a leaf node is _____.

(a) 0 (b) 1

(c) 2 (d) 4

(4) New nodes are added at _____ of the queue.

(5) Total number of the edges connecting to the node are called _____.

(a) In-degree (b) Out-degree

(c) Degree (d) None of these

(6) Graph is a linear data structure. (T/F)

(7) Which type of linked list contains a pointer to the next as well as previous node in the sequence ?

(a) Singly linked list (b) Circular linked list

(c) Doubly linked list (d) All of these

(8) Element in a priority queue are processed randomly. (T/F)

(9) Stack is _____.

(a) LIFO (b) FIFO

(c) FILO (d) LILO

(10) Total number of nodes in the n^{th} level of a binary tree can be given as

(a) 2h (b) 2^h

(c) 2^{h+1} (d) 2^{h-1}

(11) A graph G can have many different spanning trees. (T/F)

(12) In which sorting, consecutive adjacent pairs of elements in the array are compared with each other ?

(a) Bubble sort (b) Selection sort

(c) Merge sort (d) Radix sort

(13) A path P is known as a _____ path if the edge has the same end points.

(14) A linked list can store only integer values. (T/F)

(15) Define Isolated Node.

_____