Sem III CBGS I.T. 24/5/16.

Data structure & Algorithm Analysis.

QP Code : 30672

(3 Hours) [80 Marks]

1. Question No. 1 is compulsory.
2. Answer any three out of remaining questions.
3. Assume suitable data if necessary.
4. Figures to the right indicate full marks.

1 (a) Explain with example 3

(i) Degree of tree

(ii) Height of tree

(iii) Depth of tree

(b) What is linked list? Give its applications. 2

(c) What is recursion? State its advantages and disadvantages. 3

(d) Define Asymptotic Notation along with example. 3

(e) What is Expression Tree? Give Example. 3

(f) What are linear and non-linear data structures? 3

(g) What is time Complexity? Determine the Time Complexity for the following code: 3

```
for (c = 0 ; c < ( n - 1 ); c++)
  {
for (d = 0 ; d < n - c - 1; d++)
    {
if (array[d] > array[d+1]) /* For decreasing order use < */
      {
swap       = array[d];
array[d]   = array[d+1];
array[d+1] = swap;
      }
    }
  }
```

2. (a) Write a program to implement queue using array. 10

2. (b)Write an algorithm for merge sort and comment on its complexity. 10

3. (a)Define binary search tree. Write algorithm to implement insertion and deletion operation. 10

3. (b)Write a program to create single link list and display the list. 10

4. (a)What is priority queue? Give implementation of it. 10

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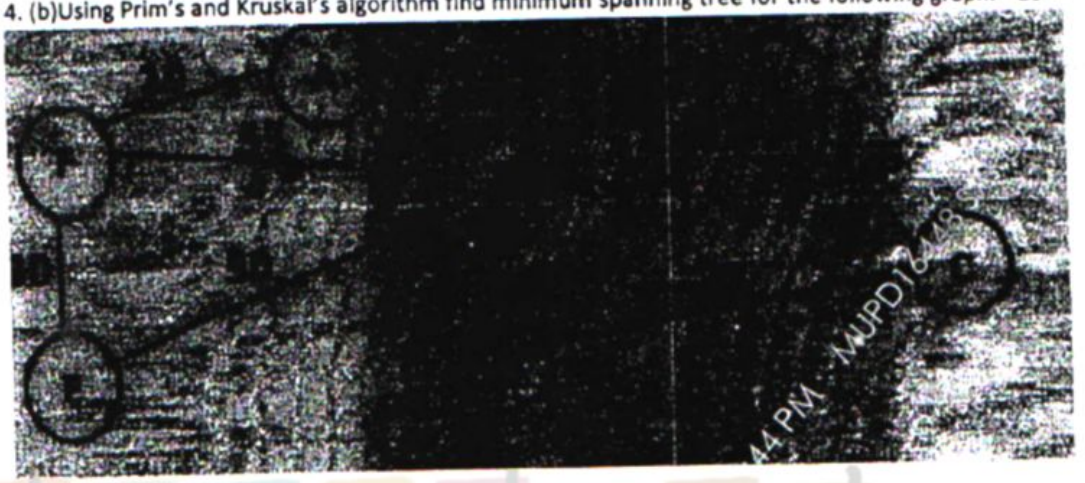
4. (b)Using Prim's and Kruskal's algorithm find minimum spanning tree for the following graph: 10



5. (a) What is an AVL tree? Construct the AVL tree for the following set of data. 10

14, 10, 1, 20, 17, 24, 18, 12, 15, 11, 4, 6

5. (b)Construct the binary tree for the inorder and post order traversal sequence given below. 10

In order: "INFORMATION"

Post order: "INOFMAINOTR"

6. Write short note on any four of the following: - 20

i. Euclid's Algorithm

ii. Red and Black Trees

iii. DFS and BFS

iv. B-Tree

v. Radix Sort

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Read As :

4. (b)Using Prim's and Kruskal's algorithm find minimum spanning tree for the following graph: 10