[4457] - 212

S.E. (Computer Engg.) (Semester - I)
## DATA STRUCTURES AND PROBLEM SOLVING
(2012 Course)

Time :2 Hours] *[Max. Marks :50*

Instructions to the candidates:-

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*

2) *Neat diagrams must be drawn wherever necessary.*

3) *Figures to the right indicate full marks.*

4) *Assume suitable data, if necessary.*

Q1) a) Draw the IPO chart for obtaining the solution for "Calculating the area of Triangle'. **[3]**

b) Define the terms with respect to sorting: internal sort, external sort and sorting stability. **[3]**

c) Convert the following generalized tree into a binary tree. **[3]**
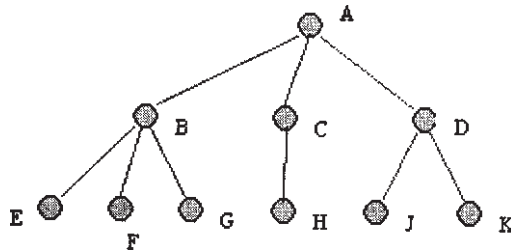
d) What is the necessity of threaded binary tree? Define the terms inorder successor and inorder predecessor with respect to inorder threaded binary tree. **[3]**

OR

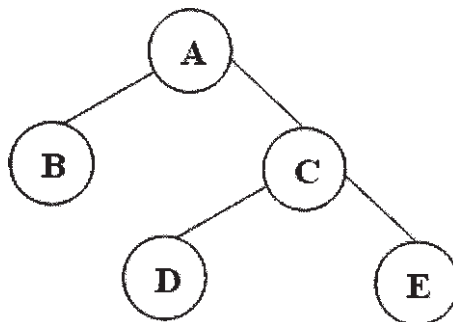*P.T.O*

Q2) a) Find the frequency count of the following code : **[3]**

```
for(i=0;i<n;i++ )
{
    for(j=0;j<n;j++ )
    {
        c[i][j] = 0;
        for(k=0;k<n;k++ )
        c[i][j] = a[i][k] * b[k][j];
    }
}
```

b) Sort the following data in ascending order using Radix Sort:

25, 06, 45, 60, 140, 50, **[3]**

c) Represent the following binary tree using array. **[3]**

d) Write a pseudo C/C++ code for any of the recursive depth first traversal of the binary tree. **[3]**

Q3) a) Explain any three applications of graphs in the area of Computer Engineering. **[3]**

b) Differentiate between Prim's and Kruskal's algorithm for generating the spanning tree of the graph. **[3]**

c) Create an AVL tree for the following data by inserting it in an order one at a time :

10, 20, 15, 12, 25, 30. **[4]**

d) Enlist the names of static tree tables with suitable example. **[2]**

OR

www.manaresults.co.in

Q4) a) Explain the situation in which linked representation of a graph is more beneficial than array representation. **[2]**

b) Write a pseudo C/C++ code for finding depth first traversal of the graph. **[4]**

c) What is the use of hash tables? Enlist the characteristics of good hash function. **[3]**

d) Assume the size of hash table as 8. The hash function to be used to calculate the hash value of the data X is: X%8. Insert the following values in hash table: 10, 12, 20, 18, 15. Use linear probing without replacement for handling collision. **[3]**

Q5) a) Write a pseudo C/C++ code to sort the data in ascending order using heap sort. **[6]**

b) Create a B tree of order 3 for the following data : 20, 10, 30, 15, 12, 40, 50. **[4]**

c) Explain the various modes of opening the file in C or C++. **[3]**

OR

Q6) a) Sort the following data in ascending order using heap sort: 15, 10, 40, 25. **[4]**

b) Write a pseudo C/C++ code to search the data stored in a B tree. **[6]**

c) Explain any three operations carried out on sequential files. **[3]**

Q7) a) Write a parallel algorithm to calculate the addition of numbers stored in an array using prefix computation method. **[6]**

b) Explain the various models used for parallel computation. **[4]**

c) Explain pointer doubling problem in brief. **[3]**

OR

Q8) a) Write a parallel algorithm for odd - even merge sort. Explain the algorithm with suitable Example. **[7]**

b) Write a parallel algorithm to perform the addition of the given numbers using complete binary tree method. **[6]**

✪✰✪✰