21314

3 Hours/100 Marks   Seat No.

Instructions : (1) **All** questions are **compulsory**.
             (2) Figures to the **right** indicate **full** marks.
             (3) Assume **suitable** data, if **necessary**.

MARKS

1. A) Attempt **any three** :   **12**

     1) Explain time complexity and space complexity.

     2) WAP to implement linear search for 10 elements in an array.

     3) Explain stack as an abstract data type.

     4) Explain the concept of information, Next, Null pointer and empty list with respect to link list.

     5) Write an algorithm for quick sort.

   B) Attempt **any two** :   **8**

     1) Write a programme to arrange 10 elements in an array in ascending order.

     2) Describe priority queue with example.

     3) List types of trees and explain any one.

2. Attempt **any four** :   **16**

   1) WAP to implement bubble sort.

   2) Convert the following infix expression to its postfix form

     i) $A + B - C*D/E + F$

     ii) $A * B - C \uparrow D + E/F$

   3) Explain the concept of circular queue.

   4) Write an algorithm to insert a node in between in a link list.

   5) Describe the concept of binary tree and its application.

   6) Explain indegree and outdegree of a graph with example.

MARKS

3. Attempt **any four** : 16

   1) Explain the two approaches of designing an algorithm.

   2) Write an algorithm to implement binary search.

   3) WAP using recursion to print the factorial of a number.

   4) Explain queue as an abstract data type, also give applications of queue.

   5) WAP to search an element in a link list.

   6) Write the preorder and postorder traversal of a tree.
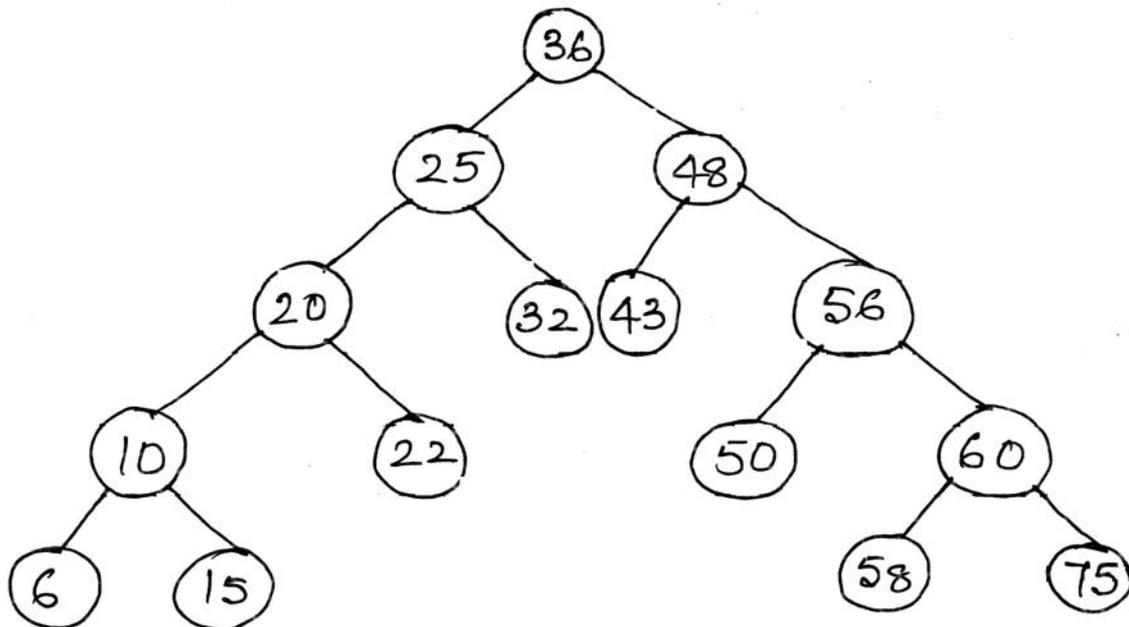
4. Attempt **any four** : 16

   1) Explain the big '0' notation.

   2) Explain merge sort for 6 numbers.

   3) Explain the concept of double ended queue.

   4) Explain the concept of linear list with example.

   5) What is meant by binary search tree with example ?

   6) Explain the concept of hashing and hash function.

MARKS

5. Attempt **any two** :   16

1) What is the affect of PUSH and POP operation on to the stack ? The stack contain 10, 20, 22, 26, 28, 30, with 30 being at top of the stack. Show diagrammatically the affect of

   PUSH 46

   PUSH 48

   POP

   POP

   POP

   PUSH 82

2) Write a menu driven program to insert, delete an element in a queue and display the queue.

3) Explain the following terms w.r.t. tree with diagram (**any four**) :

   i) degree of a node

   ii) degree of a tree

   iii) level of a node

   iv) leaf node

   v) height of a tree

   vi) in degree

   vii) out degree.

6. Attempt **any two** :   16

   1) Explain the concept of representing stack through arrays. Explain the concept
      of PUSH, POP and top of the stack with example.

   2) Write an algorithm for post order traversal in a tree.

   3) Describe breadth first search traversal in a graph with example.

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