Your Roll No .. . .

6180 **J**

B.Sc. (H) COMPUTER SCIENCE/II Sem.

Paper—201   DATA STRUCTURE

(Admissions of 2001 and onwards)

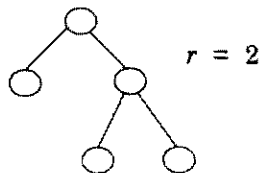*Time*   3 *Hours*   *Maximum Marks*   75

(*Write your Roll No on the top immediately
on receipt of this question paper.*)

Attempt **all** *questions*

Parts of a question should be answered together

1   Give the class definition of a singly linked list   Write member functions for each of the following

   (a)   Delete every third element from a list

   (b)   Compare whether two lists are identical   2+4+4

2.   (a)   Let r denote the number of nodes that are right child of their parents   Using templates write a function to compute r in a binary search tree   4

       Example
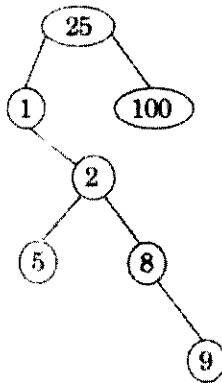

$r = 2$

(b) Given the following traversals of a binary search tree, construct the corresponding binary search tree

Inorder AKNPR

Preorder KAPNR   3

(c) Consider the following binary search tree ·

Show the resultant tree after each of the following operations

(i) Delete the node with value 2 by copying

(ii) Delete the node with value 2 by merging.

2+2

3   (a) Write a program to check whether a given string is palindrome or not using stack A string is said to be a palindrome when it reads the same forward and backward For eg madam is palindrome since its reverse is madam   4

(b) Assuming an array of size 4 elements, show Linear

Queue and Circular Queue separately when following operations are performed

Insert X, Insert Y, Delete X, Insert Z, Insert T, Insert U, Delete Y 4

4 (a) (i) Write a recursive function to compute the sum of n numbers passed as an array

(ii) Remove the tail recursion and give its iterative version for the following code

```
void cube (int n)
{
If (n > 0)
{
cout << n*n*n,
cube (n–1),
}
}                    4+3
```

(b) Write a program to store and retrieve symmetric matrix of size n*n using one dimensional array

6

5 (a) What is copy constructor? Identify the conditions in which copy constructor is called Explain it with an example 4

(b) What is a friend function? Explain its utility 4

(c) Consider the following class :

class complex

{

int real, img,

public·

}

(i) Overload binary operator + and – to perform addition and subtraction of two complex numbers

(ii) Overload = = to check the equality of two complex numbers.   3+3

6   Give the output of the following .

(a) #include <iostream h>

class base

{

virtual void f1()

{

cout<<"Inside Base",

}

}

class derived public base

{

void f1()

{

```
        cout <<"Inside derived",

    }

}

    class derived1  public derived

    {

    }

    void main()

    {

    base *bp, b,

    derived d,

    derived1 d1,


    bp=&b,

    bp->f1(),

    bp=&d,

    bp->f1(),

    bp=&d1,

    bp->f1(),

    }
```

(b)   #include <iostream h>

       void Xhandler (int test) throw (int, char, double)

       {

       if(test==0) throw test,

```
    if(test==1) throw 'a',

    if(test==2) throw 123.23;

    }

void main ()

{

cout<<"Start\n",

try

{

Xhandler(0),

Xhandler(1),

Xhandler(2),

}

catch(  )

{

cout<<"Exception Caught",

}

catch(int i)

{

cout<<"caught"<<i,

}

catch(char ch)

{

cout<<"caught"<<ch,

}

}
```

5+5

7   (a)   Write a function to insert an element at kth position in an array   3

    (b)   What are preprocessor directives? Write a macro to swap two numbers   3

    (c)   What is an inline function? Explain its significance

                                                                                    3