This question paper contains 8 printed pages]

Your Roll No. ....

6601

B.Sc. (Hons.) COMPUTER SCIENCE/I Sem.   B

Paper CSHT 101 : Programming Fundamentals

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 the questions must be attempted together.

Mention the assumptions made in your answers.

1.   (*a*)   What do you understand by top-down design approach ?   3

     (*b*)   With the help of an example, explain the divide-and-conquer strategy.   3 .

     (*c*)   Design an algorithm that makes the following exchanges :
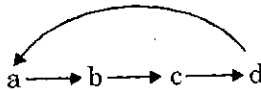
The arrows indicate that b is to assume the value of a, c the value of b, and so on.   3

P.T.O.

(d) Briefly explain the different types of computer software.   3

(e) Interpret the following 32-bit floating point number represented in Excess-127 format :   3

1 11110110 10101100000000000000000

2. Differentiate between the following (giving appropriate examples) :

(i) lvalue and rvalue

(ii) runtime and compile time polymorphism

(iii) copy constructor and overloaded assignment operator

(iv) call by value, call by reference and call by pointers

(v) enumerated data type and typedef statement.   3×5

3. (a) Given the following definition. What data members and functions are directly accessible by the function void info(void) ?　　　　3

class XX

{ 　int a;

　float b;

　void initial(int);

public:

　char ch;

　get( );

protected:

　float amount;

　getamount(int);

friend sum(int, int);

} ;

class YY : public XX

{ 　　int X;

　public:

　　int j;

　　read ( );

　protected:

　　void info(void);

　　friend void B (void);

} ;

void display( );

(b) What will be the output of the following code segments ? Justify your answers.

(i) void main( )

```
{
int a = 120, b = -123;
cout.setf(ios::right, ios::adjustfield);
cout.width(12);
cout.fill('&');
cout<<b<<endl;
cout.setf(ios::left, ios::adjustfield);
cout.width(12);
cout.fill('*');
cout<<a<<endl;
cout.setf(ios::internal, ios::adjustfield);
cout.width(12);
cout.fill('#');
cout.<<b;
}
```

3

(*ii*)　int x = 0, y = 0, z = 1;

if (z < x || y > = z && z = = 1)

　　if　　(z && y)

　　`　　y = 1;

　　else

　　　　x = 1;

cout << x <<" "<< y <<" "<<z;　　　　　3

(*iii*) typedef void v;

typedef int i;

v test(i m, i n)

{

i s = 4;

double i;

i = m;

cout<<sizeof(i);

cout<<m<<s*s;

}

int main( )

{

test(7, 6);

}　　　　　3

(iv) string s1 = "Hello", s2 = "There!!!", s3 = "How

are you ?", s;

s = s1 + " " + s2 + " " + s3;

cout<<s<<endl;

cout<<s.find_last_of('o', s.length( ) − 6);   3

4. (a) Write a program that accepts the name of a file and displays the number of words in the file.   6

(b) A C++ program contains the following declaration :

static int x[8] = {100, 200, 300, 400, 500, 600, 700, 800};

(i) What does (x + 2) indicate ?

(ii) What will be the values of the following ?

(1) * x

(2) (* x + 2)

(3) * (x + 2).   4

(c) If four objects of a class are defined, how many copies of class data items are stored in the memory and how many copies of its member functions ?   2

(d) What are virtual functions ? Is it possible to declare an object of a class that contains a virtual function ? Justify your answer.   3

5. (a) Identify the errors in the. following code segments. Also mention how those errors can be removed. 2

(i) float real[3];

```
real[0] = 121.2;
real[1] = 21.24;
real[3] = 67.2;
ptr = &real;
cout<<*ptr;
```

(ii) class ABC

```
{
    private:
        . . .
    public:
        int ABC (int x);
};
```
1

(iii) class x {.........};

```
class y {.........};
class z {.........};
void fun( ) throw (x,y)
{
    throw z( );
    . . . .
}
```
1

(*iv*) void PQR :: operator ? : (int x, int y, int z)

{............} 1

(*v*) void fun (int x, int y)

{

    int z;

    ⋮

    return z;

} 1

(*b*) Write a function that accepts two arrays of same size and the size is also passed as an argument. The function should return 'true' if corresponding elements of two arrays are same else it should return 'false'. 3

(*c*) Define a base class vehicle and its two derived classes : Car and Scooter. Write a program to ask the user for the type of vehicle and then using the concept of runtime polymorphism, display the message "It is a two-wheeler" for scooter and "It is a four-wheeler" for car. 6