CLASS-XII
COMPUTER SCIENCE
(Subject Code 083)
SAMPLE PAPER 2014 - 15

Time allowed : 3 hours   ***Maximum Marks: 70***

Instructions: ***(i) All questions are compulsory.***

(ii) Programming Language: Section A C+ +.

(iii) Programming Language : Section B Python.

(iv) Answer either Section A or B, and Section C is compulsory.

Section A (C++)

Q1. a. Differentiate between ordinary function and member functions in C++. Explain with an example.   [2]

b. Write the related library function name based upon the given information in C++.

(i) Get single character using keyboard. This function is available in stdio.h file.
(ii) To check whether given character is alpha numeric character or not. This

function is available in ctype.h file.   [1]

c. Rewrite the following C++ program after removing all the syntactical errors (if any), underlining each correction. :   [2]

```
include<iostream.h>
#define PI=3.14
void main( )
{ float r;a;
  cout<<'enter any radius';
  cin>>r;
  a=PI*pow(r,2);
 cout<<"Area="<<a
}
```

d. Write the output from the following C++ program code: [2]

```
#include<iostream.h>
#include<ctype.h>
```

```cpp
void strcon(char s[])
{
    for(int i=0,l=0;s[i]!='\0';i++,l++);
    for(int j=0; j<l; j++)
    {
            if (isupper(s[j]))
                                s[j]=tolower(s[j])+2;
            else if ( islower(s[j]))
                                s[j]=toupper(s[j])-2;
            else
                                s[j]='@';
    }
}
void main()
{
    char *c="Romeo Joliet";
    strcon(c);
    cout<<"Text= "<<c<<endl;
    c=c+3;
    cout<<"New Text= "<<c<<endl;
    c=c+5-2;
    cout<<"last Text= "<<c
}
```

e. Find the output of the following C++ program: [3]

```cpp
#include<iostream.h>
#include<conio.h>
#include<ctype.h>
class Class
{
int Cno,total;
char section;
public:
Class(int no=1)
{
 Cno=no;
 section='A';
 total=30;
 }
 void addmission(int c=20)
 {
 section++;
 total+=c;
 }
 void ClassShow()
 {
 cout<<Cno<<":"<<section<<":"<<total<<endl;
```

```
        }
                } ;
                void main()
                {
                 Class C1(5),C2;
                 C1.addmission(25);
                 C1.ClassShow();
                 C2.addmission();
                 C1.addmission(30);
                 C2.ClassShow();
                 C1.ClassShow();
                }
```

f. Study the following C++ program and select the possible output(s) from it :
   Find the maximum and minimum value of L.   [2]

```
        #include<stdlib.h>
        #include<iostream.h>
        #include<string.h>
        void main()
        {
        randomize();
        char P[]="C++PROGRAM";
        long L;
        for(int I=0;P[I]!='R';I++)
        {
        L=random (sizeof(L)) +5;
        cout<<P[L]<<"-";
        }
        }
        }
```

        i) R-P-O-R-
        ii) P-O-R-+-
        iii) O-R-A-G-
        iv) A-G-R-M-

Q2.a. How encapsulation and abstraction are implemented in C++ language?
Explain with an example.   [2]

b. Answer the questions (i) and (ii) after going through the following C++ class:
                                                                        [2]
```
        class Stream
        {
                int StreamCode ; char Streamname[20];float fees;
            public:
                Stream( )              //Function 1
        {
```

```
                              StreamCode=1;   strcpy  (Streamname,"DELHI");
fees=1000;
}
void display(float C)      //Function 2
{
cout<<StreamCode<<":"<<Streamname<<":"<<fees<<endl;
}
~Stream( )       //Function 3
{
                 cout<<"End of Stream Object"<<endl;
}
Stream (int SC,char S[ ],float F)  ;         //Function 4
};
```

i)   In Object Oriented Programming, what are Function 1 and Function 4 combined together referred as? Write the definition of function 4.

ii) What is the difference between the following statements?
     Stream S(11,"Science",8700);
     Stream S=Stream(11,"Science",8700);

c. Define a class Customer with the following specifications.   [4]

       Private Members :
       Customer_no integer
       Customer_name char (20)
       Qty integer
       Price, TotalPrice, Discount, Netprice float
       Member Functions:
       Public members:
       * A constructer to assign initial values of Customer_no as 111,Customer_name as "Leena", Quantity as 0 and Price, Discount and Netprice as 0.
       *Input( ) – to read data members(Customer_no, Customer_name, Quantity and Price) call Caldiscount().
       * Caldiscount ( ) – To calculate Discount according to TotalPrice and NetPrice
       TotalPrice = Price*Qty
       TotalPrice >=50000 – Discount 25% of TotalPrice
       TotalPrice >=25000 and TotalPrice <50000 - Discount 15% of TotalPrice
       TotalPrice <250000 - Discount 10% of TotalPrice
       Netprice= TotalPrice-Discount
       *Show( ) – to display Customer details.

d. Answer the questions (i) to (iv) based on the following code: [4]

       class AC
              {
```

```cpp
                    char Model[10];
                    char Date_of_purchase[10];
                    char Company[20];
          public( );
                AC( );
                    void entercardetail( );
                    void showcardetail( );
          };
          class Accessories : protected AC
          {
          protected:
                    char Stabilizer[30];
                    char AC_cover[20];
          public:
                    float Price;
                    Accessories( );
                    void enteraccessoriesdetails( );
                    void showaccessoriesdetails( );
          };
          class Dealer : public Accessories
          {
                    int No_of_dealers;
                    char dealers_name[20];
                    int No_of_products;
          public:
                    Dealer( );
                    void enterdetails( );
                    void showdetails( );
          };
```

(i) How many bytes will be required by an object of class Dealer and class Accessories?

(ii) Which type of inheritance is illustrated in the above c++ code? Write the base class and derived class name of class Accessories.

(ii) Write names of all the members which are accessible from the objects of class Dealer.

(iv) Write names of all the members accessible from member functions of class Dealer.

Q3a) An array T[-1..35][-2..15] is stored in the memory along the row with each element occupying 4 bytes. Find out the base address and address of element T[20][5], if an element T[2][2] is stored at the memory location 3000. Find the total number of elements stored in T and number of bytes allocated to T

[3]

b. Write a function SORTSCORE() in C++ to sort an array of structure IPL in descending order of score using selection sort . [3]

Note : Assume the following definition of structure IPL.
struct IPL
{
int Score;
char Teamname[20];
};

c. Write member functions to perform **POP and PUSH** operations in a **dynamically allocated stack** containing the objects of the following structure: [4]

```
    struct Game
      { char Gamename[30];
        int numofplayer;
        Game *next;    };
```

d. Write a function in C++ to print the sum of all the non-negative elements present on both the diagonal of a two dimensional array passed as the argument to the function. [2]

e. Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:

2,13, + , 5, -,6,3,/,5,*,< [2]

Q4. a. Write the command to place the file pointer at the 10th and 4th record starting position using seekp() or seekg() command. File object is 'file' and record name is 'STUDENT'. [1]

   b. Write a function in C++ to count and display the no of three letter words in the file "VOWEL.TXT". [2]

Example:

        If the file contains:
        A boy is playing there. I love to eat pizza. A plane is in the sky.
        Then the output should be: 4

c. Given the binary file CAR.Dat, containing records of the following class CAR type: [3]

```
        class CAR
        {
                int C_No;
                char C_Name[20];
                float Milage;
        public:
                void enter( )
```

```
            {
            cin>> C_No ; gets(C_Name) ; cin >> Milage;
            }
                        void display( )
            {
            cout<< C_No ; cout<<C_Name ; cout<< Milage;
            }
                        int RETURN_Milage( )
                        {
                              return Milage;
                        }
                  };
```

Write a function in C++, that would read contents from the file CAR.DAT and display the details of car with mileage between 100 to 150.

Section B (Python)

Q1.a) How is a static method different from an instance method?   [2]

   b) Name the function / method required for   [1]

      i) Finding second occurrence of m in **madam**.
      ii) get the position of an item in the list

c) Rewrite the following python code after removing all syntax error(s). Underline the corrections done.   [2]

```
      def main():
      r = raw-input('enter any radius : ')
      a = pi * math.pow(r,2)
      print " Area = " + a
```

d) Give the output of following with justification   [2]
      x = 3
      x+= x-x
      print x

e) What will be printed, when following python code is executed   [3]
class person:
            def __init__(self,id):
                  self.id = id
      arjun = person(150)
      arjun.__dict__['age'] = 50
      print arjun.age + len(arjun.__dict__)

Justify your answer.

f) What are the possible outcome(s) expected from the following python code? Also specify maximum and minimum value, which we can have.   [2]

```
        def main():
          p = 'MY PROGRAM'
          i = 0
           while p[i] != 'R':
              l = random.randint(0,3) + 5
              print p[l],'-',
              i += 1
   i) R - P - O - R -
   ii) P - O - R - Y  -
   iii) O -R - A - G -
   iv) A- G - R - M -
```

Q2. a) How data encapsulation and data abstraction are implemented in python, explain with example.   [2]

b) What will following python code produce, justify your answer   [2]

```
        x = 5
        y = 0
        print 'A'
        try :
           print 'B'
           a = x / y
           print 'C'
        except  ZerorDivisionError:
           print 'F'
        except :
           print 'D'
```

c) Write a class customer in python having following specifications   [4]

Instance attributes:

customernumber   - numeric value
customername   - string value
price, qty, discount, totalprice, netprice   - numeric value
methods :

init() to assign initial values of customernumber as 111, customername as "Leena", qty as 0 and price, discount & netprice as 0.
caldiscount ( ) – To calculate discount, totalprice and netprice
     totalprice = price * qty
     discount is 25% of totalprice, if totalprice >=50000
     discount 15% of totalprice, if totalprice >=25000 and totalprice <50000
     discount 10% of totalprice, if totalprice <250000

netprice= totalprice - discount

input() – to read data members customername, customernumbar, price, qty and call caldiscount() to calculate discount, totalprice and netprice.
show( ) – to display Customer details.

d) What are the different ways of overriding function call in derived class of python ? Illustrate with example. [2]

e) Write a python function to find sum of square-root of elements of a list. List is received as argument, and function returns the sum. Ensure that your function is able to handle various situations viz. list containing numbers & strings, module required is imported etc. [2]

Q3. a) What will be the status of following list after third pass of bubble sort and third pass of selection sort used for arranging elements in ascending order?
40, 67, -23, 11, 27, 38, -1 [3]

b) Write a python function to search for a value in the given list using binary search method. Function should receive the list and value to be searched as argument and return 1 if the value is found 0 otherwise. [2]

c) Define stack class in python to operate on stack of numbers. [4]

d) Write a python function using yield statement to generate prime numbers till the value provided as parameter to it. [3]

e) Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:
2,13, + , 5, -,6,3,/,5,*,< [2]

Q4.a) How is method write() different from writelines() in python? [1]

b) Given a pickled file - **log.dat**, containing list of strings. Write a python function that reads the file and looks for a line of the form

Xerror: 0.2395

whenever such line is encountered, extract the floating point value and compute the total of these error values. When you reach end of file print total number of such error lines and average of error value. [3]

c) Given a text file **car.txt** containing following information of cars
carNo, carname, milage. Write a python function to display details of all those cars whose milage is from 100 to 150. [2]

Section C

Q5. a. Define degree and cardinality. Based upon given table write degree and cardinality. [2]

PATIENTS

PatNo	PatName	Dept	DocID
1	Leena	ENT	100
2	Surpreeth	Ortho	200
3	Madhu	ENT	100
4	Neha	ENT	100
5	Deepak	Ortho	200

b. Write SQL commands for the queries (i) to (iv) and output for (v) & (viii) based

on a table COMPANY and CUSTOMER [6]

COMPANY

CID	NAME	CITY	PRODUCTNAME
111	SONY	DELHI	TV
222	NOKIA	MUMBAI	MOBILE
333	ONIDA	DELHI	TV
444	SONY	MUMBAI	MOBILE
555	BLACKBERRY	MADRAS	MOBILE
666	DELL	DELHI	LAPTOP

CUSTOMER

CUSTID	NAME	PRICE	QTY	CID
101	Rohan Sharma	70000	20	222
102	Deepak Kumar	50000	10	666
103	Mohan Kumar	30000	5	111
104	Sahil Bansal	35000	3	333

105	Neha Soni	25000	7	444
106	Sonal Aggarwal	20000	5	333
107	Arjun Singh	50000	15	666

(i) To display those company name which are having prize less than 30000.
(ii) To display the name of the companies in reverse alphabetical order.
(iii) To increase the prize by 1000 for those customer whose name starts with 'S'
(iv) To add one more column totalprice with decimal(10,2) to the table customer
(v) SELECT COUNT(*) ,CITY FROM COMPANY GROUP BY CITY;
(vi) SELECT MIN(PRICE), MAX(PRICE) FROM CUSTOMER WHERE QTY>10 ;
(vii) SELECT AVG(QTY) FROM CUSTOMER WHERE NAME LIKE "%r%;
(viii) SELECT PRODUCTNAME,CITY, PRICE FROM COMPANY,CUSTOMER
WHERE COMPANY.CID=CUSTOMER.CID AND PRODUCTNAME="MOBILE";

Q6. a) State and define principle of Duality. Why is it so important in Boolean
Algebra? [2]

b) Write the equivalent boolean expression for the following logic circuit [2]
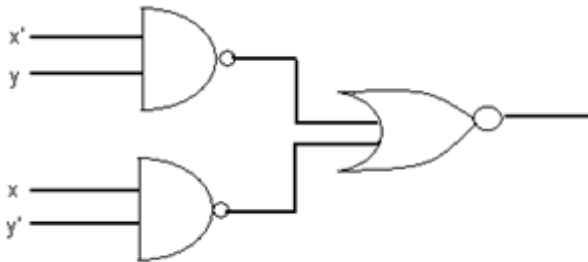
c) Write Product Of Sum expression of the function F (a,b,c,d) from the given
truth table [1]

a	b	c	d	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1

1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

d) Obtain the minimal SOP form for the following boolean expression using K-Map.

F(w,x,y,z) = (0,2,3,5,7,8,10,11,13,15)   [3]

Q7.a.Give any two advantage of using Optical Fibres.   [1]

b. Indian School, in Mumbai is starting up the network between its different wings. There are Four Buildings named as SENIOR, JUNIOR, ADMIN and HOSTEL as shown below.:   [4]

SENIOR

JUNIOR

ADMIN

HOSTEL

The distance between various buildings is as follows:

ADMIN TO SENIOR	200m
ADMIN TO JUNIOR	150m
ADMIN TO HOSTEL	50m
SENIOR TO JUNIOR	250m
SENIOR TO HOSTEL	350m
JUNIOR TO HOSTEL	350m

Number of Computers in Each Building

SENIOR	130
JUNIOR	80
ADMIN	160
HOSTEL	50

(b1)   Suggest the cable layout of connections between the buildings.
(b2)   Suggest the most suitable place (i.e. building) to house the server of this School, provide a suitable reason.

(b3)   Suggest the placement of the following devices with justification.
·   Repeater
·   Hub / Switch
(b4)   The organization also has Inquiry office in another city about 50-60 Km away in Hilly Region. Suggest the suitable transmission media to interconnect to school and Inquiry office out of the following .

·   Fiber Optic Cable
·   Microwave
·   Radio Wave

c. Identify the Domain name and URL from the following.   [1]

            http://www.income.in/home.aboutus.hml
d. What is Web Hosting?   [1]
e. What is the difference between packet & message switching?   [1]
f. Define firewall.   [1]
g. Which protocol is used to creating a connection with a remote machine?   [1]