SET – 4

Code No. **91/1**

Roll No. ☐☐☐☐☐☐☐

Candidates must write the Code on
the title page of the answer-book.

- Please check that this question paper contains **16** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **11** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

COMPUTER SCIENCE

Time allowed : 3 hours]   *[Maximum marks : 70*

General Instructions :

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

    (ii)   *Programming Language : Section **A** refers to C++*

    (iii)   *Programming Language : Section **B** refers to Python.*

    (iv)   *Attempt either Section **A** or Section **B**.*

    (v)   *Section **C** is compulsory for **all**.*

    (vi)   *It is compulsory to mention 'Section **A**' or 'Section **B**' before attempting the question paper.*

Section – A
(Only for C++ Candidates)

1.   (a)   Find the correct identifiers out of the following, which can be used for naming variable, constants or functions in a C++ program :   **2**

             While, for, Float, new, 2ndName, A%B, Amount2, _Counter

(b) Observe the following program very carefully and write the names of those header file(s), which are essentially needed to compile and execute the following program successfully : **1**

```
typedef char TEXT[80];
void main()
{
    TEXT Str[] = "Peace is supreme";
    int Index=0;
    while (Str[Index]!='\0')
        if (isupper(Str[Index]))
            Str[Index++]='#';
        else
            Str[Index++]='*';
    puts(Str);
}
```

(c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. **2**

Note : Assume all required header files are already being included in the program.

```
#Define float Max=70.0;
Void main()
{
    int Speed
    char Stop='N';
    cin>>Speed;
    if Speed>Max
        Stop='Y';
    cout<<Stop<<end;
}
```

(d) Write the output of the following C++ program code : **2**

Note : Assume all required header files are already being included in the program.

```
void Position(int &C1,int C2=3)
{
    C1+=2;
    C2+=Y;
}
void main()
{
    int P1=20, P2=4;
    Position(P1);
    cout<<P1<<","<<P2<<end1;
    Position(P2,P1);
    cout<<P1<<","<<P2<<end1;
}
```

(e) Write the output of the following C++ program code :   **3**

Note : Assume all required header files are already being included in the program.

```
class Calc
{
    char Grade;
    int Bonus;
public:
    Calc() {Grade='E';Bonus=0;}
    void Down(int G)
    {
        Grade-=G;
    }
    Void Up(int G)
    {
        Grade+=G;
        Bonus++;
    }
    void Show()
    {
        cout<<Grade<<"#"<<Bonus<<end1;
    }
};
void main()
{
    Calc c;
    C.Down(2);
    C.Show();
    C.Up(7);
    C.Show();
    C.Down(2);
    C.Show();
}
```

(f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable NUM. **2**

Note :

– Assume all required header files are already being included in the program.

– random(n) function generates an integer between 0 and n – 1.

```
void main()
{
    randomize();
    int NUM;
    NUM=random(3)+2;
    char TEXT[]="ABCDEFGHIJK";
    for (int I=1;I<=NUM; I++)
    {
        for(int J=NUM; J<=7;J++)
            cout<<TEXT[J];
        cout<<endl;
    }
}
```

(i)	FGHI	(ii)	BCDEFGH	(iii)	EFGH	(iv)	CDEFGH
	FGHI		BCDEFGH		EFGH		CDEFGH
	FGHI				EFGH		
	FGHI				EFGH		

2. (a) What is a copy constructor ? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it. **2**

(b) Observe the following C++ code and answer the questions (i) and (ii) :

```
class Traveller
{
    long PNR;
    char TName[20];
public :
    Traveller()                          //Function 1
    {cout<<"Ready"<<endl;}

    void Book(long P,char N[])           //Function 2
    {PNR = P; strcpy(TName, N);}

    void Print()                         //Function 3
    {cout<<PNR << TName <<endl;}

    ~Traveller()                         //Function 4
    {cout<<"Booking cancelled!"<<endl;}
};
```

(i) Fill in the blank statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code : **1**

```
void main()
{
    Traveller T;
    _____                    //Line 1
    _____                    //Line 2
}//Stops here
```

(ii) Which function will be executed at }//Stops here ? What is this function referred as ? **1**

(c) Write the definition of a class PIC in C++ with following description : **4**

Private Members

− **Pno**   //Data member for Picture Number (an integer)

− **Category**   //Data member for Picture Category (a string)

− **Location**   //Data member for Exhibition Location (a string)

− **FixLocation**   //A member function to assign

//Exhibition Location as per category

//as shown in the following table

Category	Location
Classic	Amina
Modern	Jim Plaq
Antique	Ustad Khan

Public Members

− **Enter()**   //A function to allow user to enter values

//Pno, category and call FixLocation() function

− **SeeAll()**   //A function to display all the data members

(d) Answer the questions (i) to (iv) based on the following : **4**

```
class Exterior
{
    int OrderId;
    char Address[20];
protected:
    float Advance;
```

```
public:
    Exterior();
    void Book(); void View();
};
class Paint:public Exterior
{
    int WallArea,ColorCode;
protected:
    char Type;
public:
    Paint();
    void PBook();
    void PView();
};
class Bill : public Paint
{
    float Charges;
    void Calculate();
public :
    Bill();
    void Billing();
    void Print();
};
```

(i)   Which type of Inheritance out of the following is illustrated in the above example ?

   –   Single Level Inheritance

   –   Multi Level Inheritance

   –   Multiple Inheritance

(ii) Write the names of all the data members, which are directly accessible from the member functions of class Paint.

(iii) Write the names of all the member functions, which are directly accessible from an object of class Bill.

(iv) What will be the order of execution of the constructors, when an object of class Bill is declared ?

3. (a) Write the definition of a function Alter(int A[], int N) in C++, which should change all the multiples of 5 in the array to 5 and rest of the elements as 0. For example, if an array of 10 integers is as follows : **2**

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
55	43	20	16	39	90	83	40	48	25

After executing the function, the array content should be changed as follows :

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
5	0	5	0	0	5	0	5	0	5

(b) A two dimensional array P[20] [50] is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element P[10] [30], if the element P[5] [5] is stored at the memory location 15000. **3**

(c) Write the definition of a member function Pop( ) in C++, to delete a book from a dynamic stack of TEXTBOOKS considering the following code is already included in the program. **4**

```
struct TEXTBOOKS
{
   char ISBN[20]; char TITLE[80];
   TEXTBOOKS *Link;
};
class STACK
{
   TEXTBOOKS *Top;
public:
   STACK(){Top=NULL;}
   void Push();
   void Pop();
   ~STACK();
};
```

(d) Write a function REVCOL (int P[] [5], int N, int M) in C++ to display the content of a two dimensional array, with each column content in reverse order. **3**

Note : Array may contain any number of rows.

For example, if the content of array is as follows :

15	12	56	45	51
13	91	92	87	63
11	23	61	46	81

The function should display output as :

```
11    23    61    46    81
13    91    92    87    63
15    12    56    45    51
```

(e) Convert the following infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. **2**

```
X / Y + U* (V-W)
```

4. (a) Write function definition for SUCCESS( ) in C++ to read the content of a text file STORY.TXT, count the presence of word STORY and display the number of occurrence of this word. **2**

Note :

– The word STORY should be an independent word

– Ignore type cases (i.e. lower/upper case)

Example :

If the content of the file STORY.TXT is as follows :

```
Success shows others that we can do it. It is possible to
achieve success with hard work. Lot of money does not mean
SUCCESS.
```

The function SUCCESS( ) should display the following :

```
3
```

(b) Write a definition for function Economic ( ) in C++ to read each record of a binary file ITEMS.DAT, find and display those items, which costs less than 2500. Assume that the file ITEMS.DAT is created with the help of objects of class ITEMS, which is defined below : **3**

```
class ITEMS
{
    int ID;char GIFT[20]; float Cost;
public :
    void Get()
    {
        cin>>CODE;gets(GIFT);cin>>Cost;
    }
    void See()
    {
        cout<<ID<<":"<<GIFT<<":"<<Cost<<end1;
    }
    float GetCost(){return Cost;}.
};
```

(c) Find the output of the following C++ code considering that the binary file CLIENTS.DAT exists on the hard disk with records of 100 members. **1**

```
class CLIENTS
{
    int Cno;char Name[20];
public :
    void In(); void Out();
};
void main()
{
    fstream CF;
    CF.open("CLIENTS.DAT",ios::binary|ios::in);
    CLIENTS C;
    CF.read((char*) &C, sizeof(C));
    CF.read((char*) &C, sizeof(C));
    CF.read((char*) &C, sizeof(C));
    int POS=CF.tellg()/sizeof(C);
    cout<<"PRESENT RECORD:"<<POS<<end1;
    CF.close();
}
```

Section – B
(Only for Python Candidates)

1. (a) How is _init( ) _different from _del ( ) __ ? **2**

   (b) Name the function/method required to **1**

   (i) check if a string contains only uppercase letters

   (ii) gives the total length of the list.

   (c) Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code. **2**

```
def Tot(Number)  #Method to find Total
    Sum=0
    for C in Range (1, Number+1):
        Sum+=C
    RETURN Sum
print Tot[3]      #Function Calls
print Tot[6]
```

(d) Find and write the output of the following python code : **2**

```
for Name in ['Jayes', 'Ramya', 'Taruna', 'Suraj']:
    print Name
    if Name[0]== 'T':
        break
else :
    print 'Finished!'
print 'Got it!'
```

(e) Find and write the output of the following python code : **3**

```
class Worker :
    def_init_(self,id,name) :    #constructor
        self.ID=id
        self.NAME=name
    def Change(self):
        self.ID=self.ID+10
        self.NAME='Harish'
    def Display(self,ROW):
        print self.ID,self.NAME,ROW
w=Worker(55, 'Fardeen')
w.Display(1)
w.Change()
w.Display(2)
print w.ID+len(w.NAME)
```

(f) What are the possible outcome(s) executed from the following code ? Also specify the maximum and minimum values that can be assigned to variable NUMBER. **2**

```
STRING="CBSEONLINE"
NUMBER=random.randint(0,3)
N=9
while STRING[N]!='L':
    print STRING[N]+STRING[NUMBER]+'#',
    NUMBER=NUMBER+1
    N=N-1
```

(i) ES#NE#IO#   (ii) LE#NO#ON#   (iii) NS#IE#LO#   (iv) EC#NB#IS#

2. (a) Illustrate the concept inheritance with the help of a python code. **2**

(b) What will be the output of the following python code ? Explain the try and except used in the code. **2**

```
U=0
V=6
print 'First'
try:
    print 'Second'
    M=V/U
    print 'Third',M
except ZeroDivisionError :
    print V*3
    print 'Fourth'
except:
    print V*4
    print 'Fifth'
```

(c) Write a class PICTURE in Python with following specifications : **4**

Instance Attributes

– **Pno   # Numeric value**

– **Category   # String value**

– **Location   # Exhibition Location with String value**

Methods :

– **FixLocation() # A method to assign**

　　　　　　　# Exhibition Location as per Category

　　　　　　　# as shown in the following table

Category	Location
Classic	Amina
Modern	Jim Plaq
Antique	Ustad Khan

– **Enter()   # A function to allow user to enter values**

　　　　　　　# Pno, Category and call FixLocation() method

– **SeeAll() # A function to display all the data members**

(d) What is operator overloading with methods ? Illustrate with the help of an example using a python code. **2**

(e)   Write a method in python to display the elements of list thrice if it is a number and display the element terminated with '#' if it is not a number.   **2**

For example, if the content of list is as follows :

ThisList=['41','DROND','GIRIRAJ', '13','ZARA']

The output should be

414141

DROND#

GIRIRAJ#

131313

ZARA#

3.   (a)   What will be the status of the following list after fourth pass of bubble sort and fourth pass of selection sort used for arranging the following elements in descending order ?   **3**

14, 10, -12, 9, 15, 35

(b)   Write a method in python to search for a value in a given list (assuming that the elements in list are in ascending order) with the help of Binary Search method. The method should return –1 if the value not present else it should return position of the value present in the list.   **2**

(c)   Write PUSH (Books) and POP (Books) methods in python to add Books and remove Books considering them to act as Push and Pop operations of Stack.   **4**

(d)   Write a method in python to find and display the prime numbers between 2 to N. Pass N as argument to the method.   **3**

(e)   Evaluate the following postfix notation of expression. Show status of stack after every operation.   **2**

84, 62, -, 14, 3, *, +

4.   (a)   Differentiate between the following :   **1**

(i)   **f = open('diary.txt', 'r')**

(ii)   **f = open('diary.txt', 'w')**

(b)   Write a method in python to read the content from a text file diary.txt line by line and display the same on screen.   **2**

(c) Consider the following definition of class Member, write a method in python to write the content in a pickled file member.dat. **3**

```
class Member:
    def_init_(self,Mno,N):
        self.Memno=Mno
        self.Name=N


    def Show(self):
        Display(self.Memno,"#",self.Name)
```

Section – C

(For all Candidates)

5. (a) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key. **2**

Id	Product	Qty	Price	Transaction Date
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

(b) Consider the following DEPT and WORKER tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii) : **6**

Table : DEPT

DCODE	DEPARTMENT	CITY
D01	MEDIA	DELHI
D02	MARKETING	DELHI
D03	INFRASTRUCTURE	MUMBAI
D05	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table : WORKER

WNO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	2013-09-02	1991-09-01	MALE	D01
1002	Ryma Sen	2012-12-11	1990-12-15	FEMALE	D03
1003	Mohitesh	2013-02-03	1987-09-04	MALE	D05
1007	Anil Jha	2014-01-17	1984-10-19	MALE	D04
1004	Manila Sahai	2012-12-09	1986-11-14	FEMALE	D01
1005	R SAHAY	2013-11-18	1987-03-31	MALE	D02
1006	Jaya Priya	2014-06-09	1985-06-23	FEMALE	D05

Note : DOJ refers to date of joining and DOB refers to date of Birth of workers.

(i) To display Wno, Name, Gender from the table WORKER in descending order of Wno.

(ii) To display the Name of all the FEMALE workers from the table WORKER.

(iii) To display the Wno and Name of those workers from the table WORKER who are born between '1987-01-01' and '1991-12-01'.

(iv) To count and display MALE workers who have joined after '1986-01-01'.

(v) **SELECT COUNT(*), DCODE FROM WORKER**
GROUP BY DCODE HAVING COUNT(*)>1;

(vi) **SELECT DISTINCT DEPARTMENT FROM DEPT;**

(vii) **SELECT NAME, DEPARTMENT, CITY FROM WORKER W,DEPT D WHERE W.DCODE=D.DCODE AND WNO<1003;**

(viii) **SELECT MAX(DOJ), MIN(DOB) FROM WORKER;**

6. (a) Verify the following using Boolean Laws.　　　　　　　　　　　　　　**2**
X + Y' = X.Y+X.Y'+X'.Y'

(b) Draw the Logic Circuit for the following Boolean Expression :　　　**2**
(U + V').W' + Z

(c) Derive a Canonical SOP expression for a Boolean function F, represented by the following truth table :　　　　　　　　　　　　　　　　　　　　　　**1**

A	B	C	F(A,B,C)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(d) Reduce the following Boolean Expression to its simplest form using K-Map : **3**

$F(X,Y,Z,W) = \Sigma(0,1,6,8,9,10,11,12,15)$

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks. **1**

(b) What is a spam mail ? **1**

(c) Differentiate between ftp and http. **1**

(d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication ?

Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber **1**

(e) What is Worm ? How is it removed ? **1**

(f) Out of the following, which all comes under cyber crime ? **1**

(i) Stealing away a brand new computer from a showroom.

(ii) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.

(iii) Secretly copying files from server of a call center and selling it to the other organization.

(iv) Viewing sites on a internet browser.

(g) Perfect Edu Services Ltd. is an educational organization. It is planning to setup its India campus at Chennai with its head office at Delhi. The Chennai campus has 4 main buildings – ADMIN, ENGINEERING, BUSINESS and MEDIA.

You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.
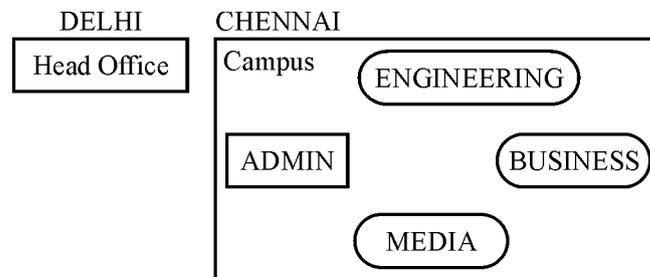
Shortest distances between various buildings :

ADMIN to ENGINEERING	55 m
ADMIN to BUSINESS	90 m
ADMIN to MEDIA	50 m
ENGINEERING to BUSINESS	55 m
ENGINEERING to MEDIA	50 m
BUSINESS to MEDIA	45 m
DELHI Head Office to CHENNAI Campus	2175 km

Number of Computers installed at various buildings are as follows :

ADMIN	110
ENGINEERING	75
BUSINESS	40
MEDIA	12
DELHI Head Office	20

(i) Suggest the most appropriate location of the server inside the CHENNAI campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer. **1**

(ii) Suggest and draw the cable layout to efficiently connect various buildings within the CHENNAI campus for connecting the computers. **1**

(iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus ? **1**

(iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of CHENNAI campus and DELHI Head Office ? **1**

   (a) Cable TV

   (b) Email

   (c) Video Conferencing

   (d) Text Chat

———————