Roll Number		

SET C

INDIAN SCHOOL MUSCAT
HALF YEARLY EXAMINATION
COMPUTER SCIENCE

CLASS: XII | Sub. Code: 083 | Time Allotted: 3 Hrs

26.09.2019 | Max. Marks: 70

General Instructions:
(a) All questions are compulsory.
(b) Programming language is C++
(c) In Questions 5(a), 7(b and c), 8(d and e) and 9(b) have internal choices.

1(a) Which C++ header file (s) will be included to run /execute the following C++ code? 1

```
void main( )
    { int  Last =26.5698742658;
     cout<<setw(5)<<setprecision(9)<<Last;
     }
```

(b) Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. Note : Assume all required header files are already included in the program. 2

```
Typedef Count int;
void main( )
{  Count C;
   cout<<"Enter the count:";
    cin>>C;
     for (K = 1; K<=C; K++)
    cout<< C "*" K <<endl;
}
```

(c) Out of the following, find those identifiers, which cannot be used for naming Variable, Constants or Functions in a C++ program: 2

_Cost, Price*Qty, float, Switch, Address+One, Delete, Number12, do

(d) Observe the following program and find out, which output(s) out of (i) to (iv) will be expected from the program? What will be the minimum and the maximum value assigned to the variable Alter? Note: Assume all required header files are included. 2

```
void main( )
{ randomize();
 int Ar[ ]={10,7}, N;
int Alter=random(2) + 10 ;
for (int C=0;C<2;C++)
{  N=random(2) ;
cout<<Ar[N] +Alter<<"#";  } }
```

(i) 21#20# (ii) 20#18# (iii) 20#17# (iv) 21#17#

(e) Find and write the output of the following C++ program code: Note: Assume all required header files are already included in the program. 3

```
void Convert(float &X, int Y=20)
{ X = X * Y;
  Y = X / Y;
  cout<<X<<"*"<<Y<<endl;
}
void main()
{ float M=40, N=10;
  Convert(M,N);
  Convert(N);
  Convert(M);
}
```

(f) Find and write the output of the following C++ program code: 3
Note: Assume all required header files are already being included in the program.

```
void main( )
{ int *Point, Ar[ ]={120,75,200,95,150,100};
  Point = Ar;
  for(int L = 0; L<6; L++)
  { if((*Point)%10 = = 0)
    *Point /= 2;
    else
    *Point = *Point - 2;
    if((*Point)%5 = = 0)
    *Point /= 5;
    Point++;
  }
  for(int L = 5; L>=0; L--)
   cout<<Ar[L]<<"*";
}
```

2(a) What do you understand by Data Encapsulation and Data Hiding? Also, give a suitable C++ code to illustrate both. 2

(b) What is the difference between an object and a class? 2

3(a) How would you compare default arguments in functions and function overloading? 2

(b) Prototypes of four overloaded functions are given below: 2

```
void callout(int a, int b, char c); //function 1
void callout(char a, float b);      // function 2
void callout(int a, float b);       //function 3
void callout(double);               // function 4
```

Write which function will be called for each of the following function calls and if any ambiguity or error, why?

(i) callout(56);
(ii) callout('p',77.2F);
(iii) callout(83,77.33f);
(iv) callout(4,66,'x');

4(a) Differentiate between protected and public visibility modes of a class in context of Object Oriented Programming giving a suitable example illustrating each. 2

(b) Write the definition of a class ENVIRONMENT in C++ with following description: 4

Private Members

- City // character of size 20
- PMLevel // integer
- Health // character of size 15
- AssignHealth( )/* Member function to assign value of Health based upon PMLevel*/

PMLevel	Health
Less than or equal to 50	Healthy
More than 50 and less than or equal to 100	Moderate
More than 100	Unhealthy

Public Members

- In( ) /* Function to allow user to enter values of City, PMLevel and then invoke AssignHealth( ) to assign value of Health */
- Out( ) //Function to display all the data members

5(a) Answer the questions (i) and (ii) after going through the following class: 2

```
class CAMERA
{ char company[15] ;
  float price ;
 public:
 CAMERA(char *c, float p)  //  function 1
 { strcpy(company,c) ;
   price = p ;}

 CAMERA( CAMERA  &temp) ;   // function 2
} ;
```

(i) Create an object, such that it invokes function 1.
(ii) Write the complete definition for function 2.

OR

(a) Write the difference between default constructor and parameterized constructor.

(b) Differentiate between Constructor and Destructor function with respect to object oriented programming. 2

6(a) What is the difference between hierarchical inheritance and multilevel inheritance? 2

(b) Answer the questions (i) to (iv) based on the following code: 4

```
class CUSTOMER
{ int Cust_no;
 char Cust_Name[20];
protected:
   void Register( );
public:
   CUSTOMER( );
   void Status( );
};

class SALESMAN
{   int Salesman_no;
   char Salesman_Name[20];
protected:
     float Salary;
public:
   SALESMAN( );
   void Enter( );
   void Show( );
};

class SHOP : private CUSTOMER , public SALESMAN
{
char Voucher_No[10];
char Sales_Date[8];
public:
    SHOP( );
    void Sales_Entry( );
    void Sales_Detail( );
 };
```

(i) Write the names of data members which are accessible from objects belonging to class CUSTOMER.

(ii) Write the names of all the member functions which are accessible from objects belonging to class SALESMAN.

(iii) Write the names of all the members which are accessible from member functions of class SHOP.

(iv) How many bytes will be required by an object belonging to class SHOP?

7(a) Write a function in C++ to read the content of a text file "NOTES.TXT" and display all those lines on screen, which are either starting with 'M' or starting with 'N'. 3

(b) Write a definition for function Economic( ) in C++ to read each record of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below: 4

```
class GIFTS
{       int CODE;
       char ITEM[20] ;
       float PRICE;
```

```
public:
  void Procure( )
       { cin>>CODE ;
         gets(ITEM) ;
         cin>>PRICE ;
         }
  void View( )
       {  cout<<CODE<<":"<<ITEM<<":"<<PRICE<<endl;  }
  float GetPrice( )
       { return PRICE; }
 };
```

OR

(b) Write a function in C++ to search and display details, whose destination is "Mumbai" from binary file "Bus.Dat". Assuming the binary file is containing the objects of the following class:

```
class BUS
{      int Bno;                  // Bus Number
       char From[20];    // Bus Starting Point
       char To[20];       // Bus Destination
   public:
       char * StartFrom ( )  { return From; }
       char * EndTo( )  { return To; }
    void input( )
       { cin>>Bno;gets(From); gets(To);  }
    void show( )
       { cout<<Bno<< ":"<<From << ":" <<To<<endl; }
};
```

(c) Observe the program segment given below carefully, and answer the questions that follows: 2

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

```
class Inventory
{
int Ano, Qty; char Article [20] ;
public:
void Input( ) {cin>>Ano;  gets (Article) ; cin>>Qty;}
void Issue(int Q) {Qty += Q;}
void procure(int Q) {Qty -= Q;}
int GetAno( ) {return Ano;}
} ;
void ProcureArticle (int TAno, int TQty)
{
fstream File;
File. open ("STOCK.DAT", ios::binary | ios::in | ios::out);
Inventory I;
int Found =0;
while (Found = =0 && File.read((char*)&I, sizeof(I)))
{
if (TAno = = I.GetAno( ))
{I.Procure (TQty) ;
_____ // Statement 1
```

```
_____ // Statement 2
Found ++;
}
}
if (Found = = 1)
cout<<"Procurement Updated"<<endl;
else
cout<<"Wrong Article No"<<endl;
File.close( );
}
```

(i) Write statement 1 to position the file pointer to the appropriate place, so that the data updation is done for the required Article.

(ii) Write statement 2 to perform the write operation so that the updation is done in the binary file.

OR

(c) Differentiate between tellp( ) and seekp( ).

8(a) Write a function bsearch( ) to search an element in a sorted array containing integer values, using binary search method. The function takes the array, number of elements and the element to be searched as arguments and returns the position, if the element is found else returns **-1**. 2

(b) Write a function SORT( ) which takes a 1D array ARR[ ] of integer values and its size "n" as arguments and sorts the array in ascending order using insertion sort. 3

(c) Write the definition of a function grace_score (int score [ ], int size) in C++, which should check all the elements of the array and give an increase of 5 to those scores which are less than 40. 3

Example: if an array of seven integers is as follows:

45, 35, 85, 80, 33, 27, 90

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

45, 40, 85, 80, 38, 32, 90

(d) Write definition for a function DISPMID(int A[ ][5],int R,int C) in C++ to display the elements of middle row and middle column from a two dimensional array A having R number of rows and C number of columns. 3

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

215	912	516	401	515
103	901	921	802	601
285	209	609	360	172

The function should display the following as output

103 901 921 802 601

516 921 609

OR

(d) Write a definition for a function SWAPCOL(int A[ ][100], int M, int N) in C++ to swap (interchange) the first column elements with the last column elements, of a two dimensional integer array. (Assuming M represents number of rows and N represents number of columns)

Example: If the two dimensional array of size 4*4 contains
2 1 4 9
1 3 7 7
5 8 6 3
7 2 1 2
After swapping of the content of 1st column and last column, it should be :
9 1 4 2
7 3 7 1
3 8 6 5
2 2 1 7

(e) T[20][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[15][5], if the element T[10][8] is stored at the memory location 52000. 3

OR

(e) An array Arr[40][10] is stored in the memory along the column with each element occupying 4 bytes. Find out the address of the location Arr[3][6] if the location Arr[30][10] is stored at the address 9000

9(a) Write the definition of a member function push( ) for a class Library in C++ to insert a book information in a dynamically allocated stack of books considering the following code is already written as a part of the program: 3

```
struct book
{ int bookid;
 char bookname[20];
 book *next;
};
 class Library
{  book *top;
 public:
    Library( )
   { top=NULL; }
    void push( );
   void pop( );
   ~Library( );
};
```

(b) Write the definition of a member function DELETE( ) for a class QUEUE in C++, to remove a product from a dynamically allocated Queue of products considering the following code is already written as a part of the program. 3

```
struct PRODUCT
{   int PID;
   char PNAME[20];
   PRODUCT *Next;
};
class QUEUE
{   PRODUCT *R,*F;
```

```
public:
 QUEUE(){R=NULL;F=NULL;}
  void INSERT();
   void DELETE();
 ~QUEUE();
};
```

OR

(b) Write the definition of a member function ADDMEM( ) for a class QUEUE in C++, to add a MEMBER in a dynamically allocated Queue of Members considering the following code is already written as a part of the program.

```
struct Member
{  int MNO;
char MNAME[20];
Member *Next;
};
class QUEUE
{  Member *Rear,*Front;
public:
 QUEUE( ){Rear=NULL;Front=NULL;}
 void ADDMEM( );
void REMOVEMEM( );
~QUEUE( ); };
```

(c) Evaluate the following postfix expression showing stack status in each stage: 2

4, 10, 5, + , * , 15, 3, / , -

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

X - Y / (Z + U) * V

End of the Question Paper