Roll Number		

SET C

INDIAN SCHOOL MUSCAT
FIRST PRE-BOARD EXAMINATION
SUBJECT : COMPUTER SCIENCE

CLASS: XII Sub.Code: 283 Time Allotted: 3 Hrs.

16.01.2020 Max.Marks: 70

General Instructions:
(i) Programming language is C++.
(ii) All questions are compulsory.
(iii) Questions 2(b), 2(d), 3 and 4 have internal choices.

I. a) Differentiate between call by value and call by reference in C++. Give an example to illustrate both. 2

b) Write the names of the correct header files, which must be included to compile the following code successfully in a C++ compiler. 1

```
void main()
{
 float Price=90,Amount;
 int Qty;
 cin>>Qty;
 Amount=Price*Qty;
 cout<<setw(10)<<Price<< "x"<<setw(10)<<Qty<< "="<<setw(10)<<Amount<<endl;
}
```

c) Rewrite the following C++ program after removing any/all syntactical error(s) underline each correction done in the code. 2
Note: Assume all required header files are already included in the program.

```
typedef int[2][3] Matrix;
void main( )
{ Matrix M = {23,45,45},{32,67,76};
 for (int C = 0;C < 2; C++)
 { for (R = 0; R < 3; R++)
   if (M[C][R]%5==0)
   cout<<M[C,R]<<"*";
   cout<<endl; }
}
```

d) Find and write the output of the following C++ program code: 2
Note: Assume all required header files are already included in the program.

```
void Changer(char Text[ ] )
{ for (int C = 0 ;Text[C] != '\0' ; C++)
  if (Text[C] >= 'A' && Text[C] <= 'M' )
```

```
  Text[C] += 2 ;
else if (Text[C] >= 'U')
  Text[C] = '#';
else
  Text[C]++;
}
void main()
{ char Str[ ] = "WINNER";
  Changer(Str);
  cout<< Str << endl;
}
```

e) Find and write the output of the following C++ program code: 3

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

```
void Calculate(int &P, int Q = 20 )
{ P = P * Q ;
 Q = P/Q ;
 cout<< P << "#"<< Q<< endl;
}
void main( )
{ int   K=25, L = 10 ;
 Calculate(K, L) ;
 Calculate(L) ;
 Calculate(K) ;
}
```

f) 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 Begin? 2

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

```
void main()
{ randomize();
  char Txt[]="ABCDEFGH";
  int Begin = random(2) + 2;
  int Last = random(3)+ Begin;
  for(int C=Begin; C<=Last; C++)
  cout<<Txt[C]<<"#";
}
```

(i) C#D#E# (ii) E#F#G#

(iii) B#C#D#E# (iv) F#G#H#

2. a) What is a parameterized constructor? Illustrate with a suitable C++ example. 2

b) Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the Function 1 to Function 4. 2

```
void My_fun ( )          // Function 1
{ for (int I=1 ; I<=50 ; I++) cout<< "-" ;
  cout<<end1 ;  }
```

```
void My_fun (int N)   // Function 2
{
for (int I=1 ; I<=N ; I++) cout<<"*" ;
 cout<<end1 ;
}
void My_fun (int A, int B)     // Function 3
{
for (int I=1. ;I<=B ;I++) cout <<A*I ;
 cout<<end1 ;
}
void My_fun (char T, int N)   // Function 4
{
for (int I=1 ; I<=N ; I++) cout<<T ;
 cout<<end1;
}
void main ( )
{
 int X=7, Y=4, Z=3;
 char C = '#' ;
 My_fun (C,Y) ;
 My_fun (X,Z) ;
}
```

OR

b) Write any four differences between Constructor and Destructor function with respect to object oriented programming. 2

c) Define a class Ele_Bill in C++ with the following descriptions: 4

Private members:

Cname of type character array
Pnumber of type long
No_of_units of type integer
Amount of type float.

Calc_Amount( ) - This member function should calculate the amount as No_of_units*Cost .
Amount can be calculated according to the following conditions:

No_of_units	Cost
First 50 units	Free
Next 100 units	0.80 @ unit
Next 200 units	1.00 @ unit
Remaining units	1.20 @ unit

Public members:

A function Accept( ) which allows user to enter Cname, Pnumber, No_of_units and invoke function Calc_Amount( ).
A function Display( ) to display the values of all the data members on the screen.

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

```
class Faculty
{     int FCode;
 protected:
    char FName[20];
```

```
public:
        Faculty( ); void Enter( );
        void Show( );
};
class Programme
{
        int PID; protected:
        char Title[30];
public:
        Programme( ); void Commence( );
        void View( );
};
class Schedule: public Programme, Faculty
{
        int DD,MM,YYYY;
public:
        Schedule( ); void Start( );
        void View( );
};
void main()
{
        Schedule S;             //Statement 1
        _____                   //Statement 2
}
```

i) Write the names of all the member functions, which are directly accessible by the object S of class Schedule as declared in main( ) function.

ii) Write the names of all the members, which are directly accessible by the member function Start( ) of class Schedule.

iii) Write Statement 2 to call function View( ) of class Programme from the object S of class Schedule.

iv) What will be the order of execution of the constructors, when the object S of class Schedule is declared inside main( )?

OR

d) Consider the following class State : 4

```
class State
{
 protected :
 int tp;
 public :
  State( ) { tp = 0 ;}
 void inctp( ) { tp++ ; }
 int gettp( ){ return tp; }
};
```

Write a code in C++ to publically derive another class 'District' with the following additional members derived in the public visibility mode.

Data Members :
Dname string
Distance float
Population long int

Member functions :
DINPUT( ) : To enter Dname, Distance and population.
DOUTPUT( ) : To display the data members on the screen.

3. a) Write a user-defined function AddEnd4(int A[ ][4],int R,int C) in C++ to find and display the sum of all the values, which are ending with 4(i.e., unit place is 4). 2
For example if the content of array is:

24	16	14
19	5	4

The output should be 42

OR

a) Write a user defined function in C++ to find the sum of both left and right diagonal elements from a two dimensional integer array A[4][4].The array is passed as argument to the function. 2

b) Write a user-defined function EXTRA_ELE(int A[ ], int B[ ], int N) in C++ to find and display the extra element in Array A. Array A contains all the elements of array B but one more element extra. (Restriction: array elements are not in order) 3

Example: If the elements of Array A is 14, 21, 5, 19, 8, 4, 23, 11
and the elements of Array B is 23, 8, 19, 4, 14, 11, 5
Then output will be 21

OR

b) Write a user defined function Reverse(int A[ ],int n) which accepts an integer array and its size as arguments(parameters) and reverse the array. 3
Example : if the array is 10,20,30,40,50 then reversed array is 50,40,30,20,10

c) An array S[10] [30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of S[5][10], if element S[2][15] is stored at the location 8200. 3

OR

c) An array A[30][10] is stored in the memory with each element requiring 4 bytes of storage ,if the base address of A is 4500 ,Find out memory locations of A[12][8], if the content is stored along the row. 3

d) Write the definition of a member function QINSERT( ) for a class QUEUE in C++, to insert a product to a dynamically allocated Queue of products considering the following code is already written as a part of the program. 4

```
struct PRODUCT
 {    int PID;
      char PNAME[20];
     PRODUCT *Next;
 };
 class QUEUE
{    PRODUCT *Rear,*Front;
 public:
   QUEUE( ) { Rear = NULL; Front =NULL;}
   void QINSERT( );
   void QDELETE( );
  ~QUEUE( );
};
```

OR

d) Write a function in C++ to PUSH( ) a node containing Books information, from a dynamically allocated stack of Books implemented with the help of the following structure: 4

```
struct Book
{
 int  BNo;
 char  BName[20];
 Book *Next;
};
  class STORE
  {   Book *Top;
   public:
      STORE( )
      { top = NULL; }
       void PUSH( );
       void POP( );
      ~STORE( );
};
```

e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. 2
A/B+C*(D - E)

OR

e) Evaluate the following Postfix expression : 4,10,5,+,*,15,3,/, - 2

4. a) Write a function RevText( ) to read a text file " Input.txt " and Print only word starting with 'I' in reverse order and display it. 2
Example: If value in text file is: INDIA IS MY COUNTRY
Output will be: AIDNI SI MY COUNTRY

OR

a) Write a function in C++ to count the number of lowercase alphabets present in a text file "BOOK.txt" and display it. 2

b) Write a function in C++ to search and display details, whose destination is "Cochin" from binary file "Bus.Dat". Assuming the binary file is containing the objects of the following class: 3

```
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; }
};
```

OR

b) Write a function in C++ to add more records at the end of a binary file "STUDENT.dat", assuming the binary file is containing the objects of the following class : 3

```
class STU
{ int Rno;
  char Sname[20];
 public:
 void Enter( )
 { cin>>Rno;gets(Sname); }
 void show( )
 { count << Rno<<sname<<endl; }
};
```

c) Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 500 products. 1

```
class PRODUCT
{int  PCode ; char PName[20] ;
public:
void Entry( ) ; void Disp( ) ;
};
void main( )
{ fstream  In ;
  In.open("PRODUCT.DAT", ios::binary | ios::in) ;
  PRODUCT P;
  In.seekg(0, ios::end) ;
  cout<< "Total Count: "<< In.tellg( )/sizeof(P)<< endl;
  In.seekg(70*sizeof(P));
  In.read((char*)&P, sizeof(P));
  In.read((char*)&P, sizeof(P));
  cout<< "At Product:"<<In.tellg( )/sizeof(P) + 1;
  In.close( );
}
```

OR

c) Which file stream is required for seekg( ) ? 1

5. a) Observe the following table and answer the parts(i) and(ii) accordingly 2

Table: Product

Pno	Pname	Qty	PurchaseDate
101	Pen	102	12-12-2011
102	Pencil	201	21-02-2013
103	Eraser	92	09-08-2010

i) Write the names of most appropriate columns, which can be considered as candidate keys.

ii) What is the degree and cardinality of the above table?

b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. 4+2

Table: **TRAINER**

TID	TNAME	CITY	HIREDATE	SALARY
101	SUNAINA	MUMBAI	1998-10-15	90000
102	ANAMIKA	DELHI	1994-12-24	80000
103	DEEPTI	CHANDIGARG	2001-12-21	82000
104	MEENAKSHI	DELHI	2002-12-25	78000
105	RICHA	MUMBAI	1996-01-12	95000
106	MANIPRABHA	CHENNAI	2001-12-12	69000

Table: **COURSE**

CID	CNAME	FEES	STARTDATE	TID
C201	AGDCA	12000	2018-07-02	101
C202	ADCA	15000	2018-07-15	103
C203	DCA	10000	2018-10-01	102
C204	DDTP	9000	2018-09-15	104
C205	DHN	20000	2018-08-01	101
C206	O LEVEL	18000	2018-07-25	105

i) Display the Trainer Name, City & Salary in descending order of their Hiredate.

ii) To display the TNAME and CITY of Trainer who joined the Institute in the month of December 2001.

iii) To display TNAME, HIREDATE, CNAME, STARTDATE from tables TRAINER and COURSE of all those courses whose FEES is less than or equal to 10000.

iv) To display number of Trainers from each city.

v) SELECT TID, TNAME, FROM TRAINER WHERE CITY NOT IN('DELHI', 'MUMBAI') ;

vi) SELECT DISTINCT TID FROM COURSE ;

vii) SELECT TID, COUNT(*), MIN(FEES) FROM COURSE GROUP BY TID HAVING COUNT(*) > 1 ;

viii) SELECT COUNT(*), SUM(FEES) FROM COURSE WHERE STARTDATE < '2018-09-15' ;

6. a) State any one Distributive Law of Boolean Algebra and Verify it using truth table. 2

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

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

X	Y	Z	F(X,Y,Z)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
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

$F(X,Y,Z,W)= \Sigma (0,1,2,3,4,5,8,10,11,14)$

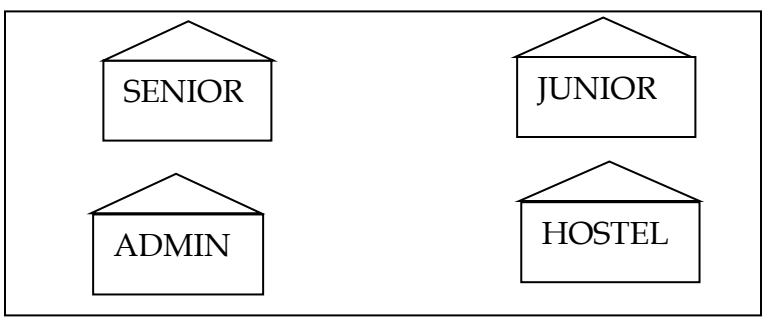
7. a) Vinod opened his e-mail and found that his inbox was full of hundreds of unwanted mails. It took him around two hours to delete these unwanted mails and find the relevant ones in his inbox. What may be the cause of his receiving so many unsolicited mails? What can Vinod do to prevent this happening in future? 2

b) Assume that 50 employees are working in an organization. Each employee has been allotted a separate workstation to work. In this way, all computers are connected through the server and all these workstations are distributed over two floors. In each floor, all the computers are connected to a switch. Identify the type of network? 1

c) Your friend wishes to install a wireless network in his office. Explain him the difference between guided and unguided media. 1

d) Write the expanded names for the following abbreviated terms used in Networking and Communications: 2
(i) CDMA (ii) HTTP (iii) XML (iv) URL

e) Multipurpose Public School, Bengaluru is Setting up the network between its Different Wings of school campus. 4
There are 4 wings named as SENIOR(S), JUNIOR (J), ADMIN (A) and HOSTEL (H).
Multipurpose Public School, Bengaluru



Distance between various wings are given below:

WingA to WingS	100m
WingA to WingJ	200m
WingA to WingH	400m
WingS to WingJ	300m
WingS to WingH	100m
WingJ to WingH	450m

Number of Computers installed at various wings are as follows:

Wings	**Number of Computers**
WingA	20
WingS	150
WingJ	50
WingH	25

i) Suggest the best wired medium and draw the cable layout to efficiently connect various wings of Multipurpose Public School, Bengaluru.

ii) Name the most suitable wing where the server should be installed. Justify your answer.

iii) Suggest a device/software and its placement that would provide data security for the entire network of the School.

iv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smart phone/laptop users in the campus of Multipurpose Public School, Bengaluru.

End of the Question Paper