Roll Number		

SET A

INDIAN SCHOOL MUSCAT
SECOND PRE-BOARD EXAMINATION
COMPUTER SCIENCE

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

12.02.2020 | Max. Marks: 70

General Instructions:

- All questions are compulsory.
- Programming Language with C++
- In Question 2(b, d), 3 and 4 has internal choices.

1(a) What is the difference between the type casting and automatic type conversion? Also, give a suitable C++ code to illustrate both. 2

(b) Write the names of the header files, which is/are essentially required to run/ execute the following c++ code: 1

```
void main ( )
{
char CH,Text[ ] ="Computer Science";
for (int I=0 ; Text[I] ! = '\0' ;I++)
if (Text[I] = = ' ')
cout<<end1;
else
{CH=toupper (Text [I]) ;
 cout<<CH;
}
}
```

(c) Rewrite the following program after removing the syntax error(s), if any. Underline each correction. 2

```
#include <iostream.h>
void main ( )
{
One = 10, Two = 20;
Callme (One;Two) ;
Callme (Two) ;
}
void Callme (int Arg1, int Arg2=20)
{
Arg1 = Arg1 + Arg2;
cout<<Arg1>> Arg2;
}
```

(d) Find the output of the following program: 3

```
#include<iostream.h>
void main ( )
{int *Ar, Moves [ ] = {55, 66, 77, 88};
Ar = Moves;
Moves [2] + = 22;
cout<< "Array @"<< *Ar <<endl;
*Ar - = 11;
Ar + = 2;
cout<< "Now @" << *Ar<<endl;
Ar++;
cout<< "Finally@" << *Ar<<endl;
cout<< "New Origin @" << Moves[0] <<endl;
}
```

(e) Find and write the output of the following C++ program code: 2

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

```
typedef char STRING[80];
void MIXNOW(STRING S)
{    int Size=strlen(S);
  for(int I=0;I<Size;I+=2)
  {     char WS=S[I];
        S[I]=S[I+1];
        S[I+1]=WS;      }
  for (int I=1;I<Size;I+=2)
   if (S[I]>='M' && S[I]<='U')
         S[I]='@';
}
void main( )
{  STRING Word="EXAMINATION2020";
   MIXNOW(Word);
   cout<<Word<<endl;
}
```

(f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables N and M. 2

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

```
void main( )
{  randomize( );
 int N=random(3), M=random(4);
 int DOCK[3][3] = {{1,2,3},{2,3,4},{3,4,5}};
 for(int R=0; R<N; R++)
{ for(int C=0; C<M; C++)
 cout<<DOCK[R][C]<<" "; cout<<endl;
}}
```

(i) 1 2 3 2 3 4 3 4 5	(ii) 1 2 3 2 3 4
(iii) 1 2 2 3	(iv) 1 2 2 3 3 4

2(a) Write any four important characteristics of Object Oriented Programming? Give example of any one of the characteristics using C++. 2

(b) Observe the following C++ code and answer the questions (i) and (ii). 2

Note: Assume all necessary files are included.

```
class TEST
{  long TCode;
   char TTitle[20];
   float Score;
public:
TEST( ) //Member Function 1
{      TCode=100;
       strcpy(TTitle, "FIRST Test");
       Score=0;
}

TEST(TEST &T) //Member Function 2
{  TCode=T.TCode+1;
   strcpy(TTitle,T.TTitle);
   Score=T.Score;
}
};
void main( )
{  _____ //Statement 1
   _____ //Statement 2
}
```

(i) Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class TEST?

(ii) Write Statement 1 and Statement 2 to execute Member Function1 and Member Function 2 respectively.

OR

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

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

Private Members

-Pno //Data member for Photo Number (an integer)
-Category //Data member for Photo Category (a string)
-Exhibit //Data member for Exhibition Gallery (a string)
-FixExhibit( ) //A member function to assign Exhibition Gallery as per Category as shown // in the following table

Category	Exhibit
Antique	Zaveri
Modern	Johnsen
Classic	Terenida

Public Members
-Register( ) //A function to allow user to enter values Pno, Category and call FixExhibit( ) //function
-ViewAll( ) //A function to display all the data members

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

```
class PRODUCT
{  int Code;
   char Item[20];
protected:
    float Qty;
 public:
     PRODUCT( );
     void GetIn( );
     void Show( );
};
 class WHOLESALER
 {   int WCode;
 protected:
     char Manager[20];
public:
      WHOLESALER( );
      void Enter( );
      void Display( );
 };
class SHOWROOM : public PRODUCT, private WHOLESALER
 {   char Name[20],City[20];
 public:
   SHOWROOM( );
   void Input( );
   void View( );
};
```

(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 SHOWROOM.

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

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

OR

(d) Consider the following class Company:

```
 class Company
{  int Code;
   char  Name[20];
protected:
 float Turnover;
```

```
public:
void In( )
        {cin>>Code;
        gets(Name);
        cin>>Turnover; }
 void Out( )
{cout<<Code<<Name<<Turnover<<endl;}
};
```

Write a code in C++ to privately derive another class Branch from base class Company with following members:

Data Members

BCode of type long

BAddress of type character of size 10

Member Functions

- A constructor function to assign BCode as 1000.
- Input() to allow user to enter BCode and BAddress.
- Output() to display BCode and BAddress.

3(a) Write a function ALTERNATE (int A[ ] [3], int N, int M) in C++ to display all alternate elements from two-dimensional array A (staring from A [0] [0]). 2

For example:

If the array is containing:

23 54 76

37 19 28

62 13 19

The output will be

23 76 19 62 19

OR

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

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:

51 45 56 12 15

63 87 92 91 13

81 46 61 23 11

(b) Write a user-defined function AlterSwap(int R[ ], int N)in C++, which should swap contents of the adjacent elements. N (which is an even integer) represents the total number of elements in the array R. 3

Example: if the array R contains the following elements (for N = 6)

0	1	2	3	4	5
20	50	70	30	80	90

Then the function should rearrange the array to become

0	1	2	3	4	5
50	20	30	70	90	80

NOTE:

- DO NOT DISPLAY the Changed Array contents
- Do not use any other array to transfer the contents of array R.

OR

(b) Write a user-defined function NoTwoThree(int Arr[ ], int N) in C++, which should display the value of all such elements and their corresponding locations in the array Arr (i.e the array index), which are not multiples of 2 or 3. N represents the total number of elements in the array Arr, to be checked.

Example: if the array Arr contains

0	1	2	3	4
25	8	12	49	9

Then the function should display the output as:

25 at location 0
49 at location 3

(c) An array A[50][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the element A[10][15] is stored at 21500, then find out the base address of the array and the memory address of element stored at location A[30][25]. 3

OR

(c) An array T[50][20] is stored in the memory along the column with each of the elements occupying 4 bytes. Find out the base address and address of element T[30][15], if an element T[25][10] is stored at the memory location 9800.

(d) 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( ); };
```

OR

(d) Write the definition of a member function DELETE( ) for a class QUEUE in C++, to perform Delete operation on a dynamically allocated Queue containing members details as given in the following definition of NODE:

```
struct NODE
{
long Mno //Member Number
char Mname[20]; //Member Name
```

```
NODE *Link;
};

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

(e) 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

OR

(e) Evaluate the following postfix notation of expression:

True, False, NOT, AND, True, True, AND,OR

4(a) A text file named MESSAGE.TXT contains some text. Another text file named SMS.TXT needs to be created such that it would store only the first 150 characters from the file MESSAGE.TXT. Write a user-defined function LongToShort( ) in C++ that would perform the above task of creating SMS.TXT from the already existing file MESSAGE.TXT. 2

OR

(a) A text file named CONTENTS.TXT contains some text. Write a user-defined function LongWords( ) in C++ which displays all such words of the file whose length is more than 9 alphabets. For example: if the file CONTENTS.TXT contains:

"Conditional statements of C++ programming language are if and switch"

Then the function LongWords( ) should display the output as:

Conditional
statements
programming

(b) Write a definition for function BUMPER( ) in C++ to read each object of a binary file GIFTS.DAT, find and display details of those gifts, which has remarks as "ON DISCOUNT". Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below: 3

```
class GIFTS
 {  int ID;
    char Gift[20], Remarks[20];
    float Price;

public:
 void Takeonstock( )
   {    cin>>ID;
        gets(Gift);
```

```
        gets(Remarks);
        cin>>Price;
    }
    void See( )
    {   cout<<ID<<":"<<Gift<<":"<<Price<<"":"<<Remarks<<endl;  }
        char *GetRemarks( )
            { return Remarks; }
};
```

OR

(b) Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as defined below). The user should enter the Model No and the function should search and display the details of the laptop.

```
class LAPTOP
{
long ModelNo ;
float RAM, HDD ;
char Details [120] ;
public:
void StockEnter ( )
{cin>>ModelNo>>RAM>>HDD; gets (Details);}
void StockDisplay ( )
{cout<<ModelNo<<RAM<<HDD<<Details<<endl;}
long ReturnModelNo ( ) {return ModelNo ;}
} ;
```

(c) Find the output of the following C++ code considering that the binary file CLIENT.DAT exists on the hard disk with a data of 1000 clients. 1

```
class CLIENT
{   int Ccode;
    char CName[20];
public:
    void Register( );
    void Display( );
};
 void main( )
{   fstream CFile;
 CFile.open("CLIENT.DAT",ios::binary|ios::in);
 CLIENT C;
 CFile.read((char*)&C, sizeof(C));
 cout<<"Rec:"<<CFile.tellg()/sizeof(C)<<endl;
 CFile.read((char*)&C, sizeof(C));
 CFile.read((char*)&C, sizeof(C));
cout<<"Rec:"<<CFile.tellg()/sizeof(C)<<endl;
 CFile.close(); }
```

OR

(c) What is the difference between seekg( ) and tellg( ) ?

5(a) Differentiate between DDL & DML commands. Identify DDL & DML commands from the following:- 2

(UPDATE, SELECT, ALTER, DROP)

(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: **VEHICLE**

CODE	VTYPE	PERKM
101	VOLVO BUS	160
102	AC DELUXE BUS	150
103	ORDINARY BUS	90
105	SUV	40
104	CAR	20

Note:

- PERKM is Freight Charges per kilometer
- VTYPE is Vehicle Type

Table: **TRAVEL**

NO	NAME	TDATE	KM	CODE	NOP
101	Janish Kin	2015-11-13	200	101	32
103	Vedika Sahai	2016-04-21	100	103	45
105	Tarun Ram	2016-03-23	350	102	42
102	John Fen	2016-02-13	90	102	40
107	Ahmed Khan	2015-01-10	75	104	2
104	Raveena	2016-05-28	80	105	4
106	Kripal Anya	2016-02-06	200	101	25

Note:

- NO is Traveller Number
- KM is Kilometer travelled
- NOP is number of travellers travelled in vehicle
- TDATE is Travel Date

(i) To display the NAME of those travellers from the table TRAVEL whose name starts with 'T'.

(ii) To display the NAME of all the travellers from the table TRAVEL who are traveling by vehicle with code 101 or 102.

(iii) To display the NO and NAME of those travellers from the table TRAVEL who travelled between '2015-12-31' and '2015-04-01'.

(iv) To display all the details from table TRAVEL for the travellers, who have travelled distance more than 100 KM in ascending order of NOP.

(v)
```
SELECT COUNT(*),CODE FROM TRAVEL
GROUP BY CODE HAVING COUNT(*)>1;
```

(vi)
```
SELECT DISTINCT CODE FROM TRAVEL;
```

(vii)
```
SELECT A.CODE,NAME,VTYPE
 FROM TRAVEL A,VEHICLE B
WHERE A.CODE=B.CODE AND KM<90;
```

(viii) SELECT NAME,KM*PERKM
FROM TRAVEL A,VEHICLE B
WHERE A.CODE=B.CODE AND A.CODE='105';

6(a) State DeMorgan's Laws of Boolean Algebra and verify them using truth table. 2

(b) Draw the Logic Circuit of the following Boolean Expression: 2

U' + V.W' + R

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

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

(d) Reduce the following Boolean expression using K-Map: 3
F(U,V,W,Z)= π(0,2,5,7,12,13,15)

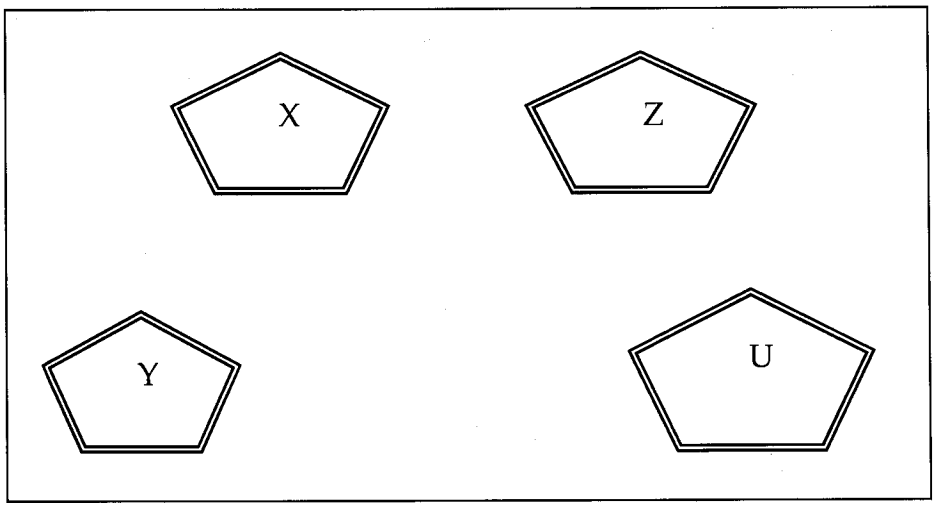
7(a) Differentiate between packet switching and message switching. 2

(b) What do you mean by data encryption? For what purpose it is used? 1

(c) Ms. Raveena Sen is an IT expert and a freelancer. She recently used her skills to access the Admin password for the network server of Super Dooper Technology Ltd. and provided confidential data of the organization to its CEO, informing him about the vulnerability of their network security. 1
Out of the following options (i) to (iv), which one most appropriately defines Ms.Sen? Justify the reason for your chosen option:
(i) Hacker (ii) Cracker (iii) Operator (iv) Network Admin

(d) Write the expanded names for the following abbreviated terms used in Networking and Communications: 2
i) PPP (ii) WAN (iii) GSM (iv) WLL

(e) Ravya industries has set up its new centre at Mangalore for its office and web based activities. The company compound has 4 buildings a shown in the diagram below:



Centre to centre distances between various buildings is as follows:

X to Y	50 m
Y to Z	150 m
Z to U	25 m
X to U	170 m
Y to U	125 m
X to Z	90 m

Number of computers in each building is as follows:

X Building	25
Y Building	50
Z Building	150
U Building	10

(i) Suggest a cable layout of connections between the buildings. 1

(ii) Suggest the most suitable place(i.e building) to house the SERVER of this organization with a suitable reason. 1

(iii) Suggest the placement of the following devices with justification: 1
(a) Repeater (b) Switch

(iv) The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed. 1

End of the Question Paper