Roll Number		

SET A

INDIAN SCHOOL MUSCAT
SECOND PRELIMINARY EXAMINATION
COMPUTER SCIENCE

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

13.02.2019 | Max. Marks: 70

General Instructions:

(a) All questions are compulsory.

(b) Programming Language with C++

(c) *In Question 2(b, d) ,3 and 4 has internal choices.*

1.a. Explain with example the difference between actual and formal arguments. 2

b. Which header file(s) will be essentially required to be included to execute the following C++ code? 1

```
void main( )
{
int Eno = 123;
char EName[ ] = " CBSE AISSCE";
cout<<setw(5)<<Eno<<setw(25)<<EName<<endl;
}
```

c. Rewrite the following program after removing any syntactical errors. Underline each correction made. 2

```
#include<iostream.h>
void main( )
int A[10];
A=[3,2,5,4,7,9,10];
for( p = 0; p<=6; p++)
{ if(A[p]%2=0)
int S = S+A[p]; }
cout<<S; }
```

d. Write the output of the following C++ program code: 3

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

```
void change(int *s)
{
for(int i=0;i<4;i++)
{
if(*s<40)
{
if(*s%2==0)
*s=*s+10;
else
*s=*s+11;
}
```

```
else
{
if(*s%2==0)
*s=*s-10;
else
*s=*s-11;
}
cout<<*s<<" ";
s++;
}
}
void main()
{ int score[]={25,60,30,52,35,53};
change(score);
}
```

e. Find the output of the following C++ program: 2

```
#include<iostream.h>
void repch(char s[])
2
{
for (int i=0;s[i]!='\0';i++)
{
if(((i%2)!=0) &&(s[i]!=s[i+1]))
{
s[i]='@';
}
else if (s[i]==s[i+1])
{
s[i+1]='!';
i++;
}
}
}
void main()
{
char str[]="SUCCESS";
cout<<"Original String"<<str
repch(str);
cout<<"Changed String"<<str;
}
```

f. Observe the following C++ code and find out , which out of the given options i) to iv) are the expected correct output.Also assign the maximum and minimum value that can be assigned to the variable 'Go'. 2

```
void main()
{ int X [4] ={100,75,10,125};
int Go = random(2)+2;
for (inti = Go; i< 4; i++)
cout<<X[i]<<"$$";
}
```

i. 100$$75 ii. 75$$10$$125$$ iii. 75$$10$$ iv.10$$125$

2.a. Differentiate between data abstraction and data hiding. 2

b. Answer the questions(i) and (ii) after going through the following class: 2

```
class planet
{
char name[20];char distance[20];
public:
planet() //Function 1
{
strcpy(name, "Venus");
strcpy(distance,"38 million km");
}
void display(char na[],char d[]) //Function 2
{
cout<<na<<"has "<<d<<" distance from Earth"<<endl;
}
planet(char na[], char d[]) //Function 3
{
strcpy(name,na);
strcpy(distance,d);
}
~planet() //Function 4
{
cout<<"Planetarium time over!!!"<<endl;
}
};
```

i) What is Function 1 referred as? When will it be executed?
ii) Write suitable C++ statement to invoke Function 2.

OR

Explain explicit and implicit call to parameterized constructor.

c. Define a class **Candidate** in C++ with the following specification : 4

Private Members :

A data members Rno(Registration Number) type long
A data member Cname of type string
A data members Agg_marks (Aggregate Marks) of type float
A data members Grade of type char
A member function setGrade () to find the grade as per the aggregate marks obtained by the student. Equivalent aggregate marks range and the respective grade as shown below.

Aggregate Marks	**Grade**
>=80	A
Less than 80 and >=65	B
Less than 65 and >=50	C
Less than 50	D

Public members:

A constructor to assign default values to data members:
Rno=0,Cname="N.A",Agg_marks=0.0
A function Getdata () to allow users to enter values for Rno. Cname, Agg_marks and call

function setGrade () to find the grade.
A function dispResult( ) to allow user to view the content of all the data members.

d. Give the following class definition answer the question that is follow: 4

```
class University
{  char name [20];
protected :
char vc[20];
public :
University();
void inputdata();
void outputdata();      } ;
class College : protected University
{  int regno;
protected:
char principal[20];
public :
int no_of_students;
void readdata();
College();
void displaydata ( );    };
class Department : public College
{ char name[20];
char HOD[20];
public :
void fetchdata(int);
Department();
void displaydata( );          } ;
void main()
{  Department  D; //Statement 1
_____ //Statement 2        }
```

i) Write Statement 2 to call function dispalydata( ) of class College from the object D of class Department.

ii) Write the names of all the data members, which are accessible from the member function readdata() belonging to class College.

iii) Write the names of all the members, which are accessible from the object of class Department.

iv) What will be the size of the objects belonging to class College and Department.

OR

```
class EAST
{ int ENo;
protected:
float Price;
public:
void E_Enter( );
void E_Display( );
}
```

Write a code in C++ to publically derive class 'SOUTH' from class 'EAST'. Class SOUTH has the following additional members :

Private Data Members :

Sname string , No_Of_Item integer

Protected data members :

Name string, SCost float

Public Member functions :
SINPUT( ) : To enter Sname, No_Of_Item
SOUTPUT( ) : To display the data members on the screen.

3.a. Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays only odd numbers divisible by 7 from the array. 2

If 2D array is

145	14	2	21	79
1	32	791	45	1000
35	678	2	3	28
9	18	273	2000	777

Output is : - 21, 791,35,273,777

OR

Write a function to interchange the second and third row of a 2 D array passed as arguments along with its row size and column size.

b. Write a C++ function that takes 1D array, its size and search element as arguments and implement binary search on the array. Function should return value 1 for successful search otherwise it should return value 0. 3

OR

Write a function which takes a 1D array and its size as arguments and sorts the array in descending order using insertionsort.

c. An array Z[40][30] is stored in memory along the column with each of the elements occupying 4 bytes. Find out the base address and the address of the element Z[20][15], if an element Z[15][10] is stored at the memory location 7200. 3

OR

An array T [2..30][-3..20] is stored in the memory along the Column with each element occupying 4 bytes of storage. Find the base address and address of the element T[20][15], if an element T[9][10] is stored at the address 9800.

d. Write a function in C++ to insert a node containing Employee information, from a dynamically allocated stack of Employee implemented with the help of the following structure. 4

```
struct Employee
{
int ENo;
char CName[20];
Employee *Link;
};
```

OR

Consider the following portion of a program, which implements passengers Queue for a train. Write the definition of function QDelete( ), to delete a node from the queue.

```
struct NODE
{
long TicketNo;
char PName[20]; // Passenger Name
NODE *NEXT;
};
class TrainQueue
{
NODE *rear, *front;
public:
TrainQueue( ) { rear = NULL, front = NULL ;}
```

```
void QDelete ( );
~TrainQueue( );
};
```

e. Evaluate the following postfix expression using a stack and show the contents of the stack after each operation. 2

100, 40, 8, +, 20, 10, -, +, *

OR

Convert the given infix expressions into its equivalent postfix form showing stack status at each step –

A+C^(D+E)*F/G

4.a. Write a function CountYouMe( ) in C++ which reads the contents of a text file story.txt and counts the words You and Me (not case sensitive). For example, if the file contains: 2

You are my best friend.
You and me make a good team.
I will never lose a good friend like you.
And you never forget me.
The function should display the output as
Count for You: 4
Count for Me : 2

OR

Write a function Mycount( ) in C++ which reads the contents of a text file story.txt and copies the contents to another file ' newstory.txt' except the blank spaces.

b. Write a function in C++ to search and display details, whose destination is "Al SEEB" 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); get(To); }
void show( ) { cout<<Bno<< ":"<<From << ":" <<To<<endl; }
};
```

OR

Write a function in C++ to modify the destination of record whose Bus number is given by the user 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 Modify(){ gets(To); }
};
```

c. Observe the following program carefully and fill in the blanks using seekg( ) and tellg( ) functions: 1

```
#include<fstream.h>
class school
 { private :
char scode[10],sname[30];
 float nofstu;
public:
void INPUT( );
void OUTPUT( );
 int COUNTREC( );  };
int school::COUNTREC( )
{ fstream fin("scool.dat",ios::in|ios::binary);
_____ //statement 1 to move pointer to end of file
 int B=_____ //statement 2 to return no of bytes till current pointer position
 int C=B/sizeof(school);
 fin.close( );
 return C; }
```

OR

Write the statement to point to the 11th record of a file containing records of the structure 'employee' .

5 a. What is the difference between a Candidate key and Primary key? 2

b. **Consider** the two tables ***Book*** and ***Issued*** in the database as shown below: 4+2

rite the SQL query commands based on following table

Table : Book

Book_id	Book name	Author_name	Publisher	Price	Type	Quantity
C0001	Fast Cook	Lata Kapoor	EPB	355	Cookery	5
F0001	The Tears	William Hopkins	First Publi.	650	Fiction	20
T0001	My First c++	Brain & Brooke	FPB	350	Text	10
T0002	C++ Brain works	A.W. Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Anna Roberts	First Publ.	750	Fiction	50

Table : Issued

Book_Id	QuantityIssued
T0001	**4**
C0001	**5**
F0001	**2**

Write SQL query for (1) to (4) and give the output for (5):

1) To show book name, Author name and price of books of First Pub. Publisher
2) To Display the names and price from books in ascending order of their prices.
3) To increase the price of all books of EPB publishers by 50.
4) To insert a new row in the table issued having the following data. 'F0003', 1

5) **Give the output of the following :**

i. **Select Count(*) from Books ;**

ii. **Select Max(Price) from books where quantity >=15 ;**

iii. **Select book_name, author_name from books where publishers='first publ.';**

iv. **Select count(distinct publishers) from books where Price>=400;**

6 a. State and prove Complementarity law. 2

b. Draw the logic circuit for the expression **(P+Q)'+Q.R'+P** 2

c. Write the SOP form of a Boolean function H, which is represented in a truth table as follows: 1

A	B	C	H
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

d. Reduce the following Boolean expression using KMap: 3

$F(X,Y,Z,W)=\pi(1,2,5,6,8,9,10,12,14,15)$

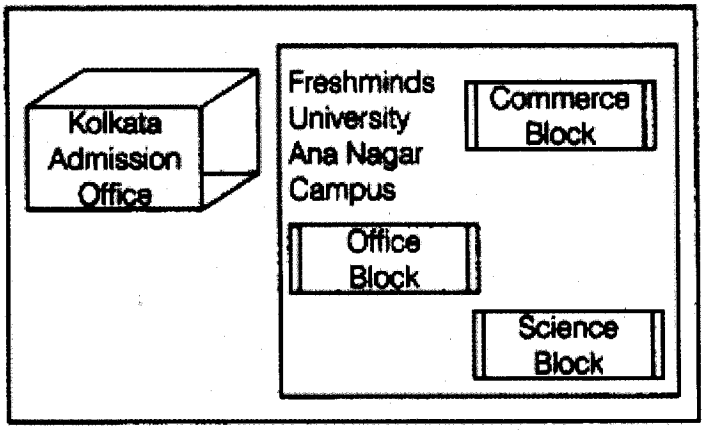
7.a. Which of the following come under cyber crime? 2
(i) Operating some one's Internet banking account, without his knowledge.
(ii) stealing a keyboard from someone's computer
(iii) Working on someone's computer with his/her permission.

b. Write one advantage of Star topology. 1

c. How is a hacker different from a cracker? 1

d. Write the abbreviations in their full form : i) GSM ii)WLL. 2

e. Freshminds University of India is starting its first campus in Ana Nagar of South India with its centre admission office in Kolkata. The university has three major blocks comprising of Office block, Science block and Commerce block is in 5 km area campus. As a network expert, you need to suggest the network plan as per (i) to (iv) to the authorities keeping in mind the distance and other given parameters 4



Expected wire distance between various locations

Office Block to Science Block	90 m
Office Block to Commerce Block	80 m
Science Block to Commerce Block	15 m
Kolkata Admission Office to Ana Nagar Campus	2450 km

Expected number of computers to be installed at various locations in the university are as follows

Office Block	10
Science Block	140
Commerce Block	30
Kolkata Admission Office	8

i) Suggest the authorities, the cable layout amongst various blocks inside university campus for connecting the blocks.

ii) Suggest the most suitable place (i.e. block) to house the server for this university with a suitable reason.

iii) Suggest an efficient device from the following to be installed in each of the block to connect all the computers.
(a) Modem
(b) Switch
(c) Gateway

iv) Suggest the most suitable (very high speed) service to provide data connectivity between admission office located in Kolkata and the campus located in Ana Nagar from the following options:
- Telephone line
- Fixedline dial-up connection
- Coaxial cable network
- GSM
- Leased line
- Satellite connection.

End of the Question Paper

Roll Number		

SET C

INDIAN SCHOOL MUSCAT
SECOND PRELIMINARY EXAMINATION
COMPUTER SCIENCE

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

13.02.2019 | Max. Marks: 70

General Instructions:

(a) All questions are compulsory.

(b) Programming Language with C++

(c) *In Question 2(b, d) ,3 and 4 has internal choices.*

1.a. Explain automatic type conversion with example. 2

b. Which header file(s) will be essentially required to be included to execute the following C++ code? 1

```
void main( )
{
int Eno = 123;
char EName[ ] = " CBSE AISSCE",P='d';
cout<<toupper(P)<<Eno<<EName<<endl;
}
```

c. 2

Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include<iostream.h>
struct Screen
{ int C, R;}
void ShowPoint(Screen P)
{
cout<<P.C, P.R<<endl;
}
void main()
{
Screen Point1 = (5, 3);
ShowPoint(Point1);
Screen Point2= point1;
C.Point1+= 2;
Point1.R = Point1.R + 2;
}
```

d. Give the output of the following program segment (Assuming all required header files are included in the program): 3

```
# include<iostream.h>
# include<ctype.h>
void change (char* state, int &s)
{ int b = s;
```

```
for (int x = 0; s>=0; x++, s--)
if ((x+s)%2)
*(state+x) = toupper(*(state+b-x));
}
void main ( )
{
char s[ ] = "Punjab";
int b = strlen (s)-1;
change (s, b);
cout<<s<<"#"<<b;
}
```

e. Give the output of the following program (Assuming that all required header files are included in the program) 2

```
void main()
{
char a[]= "Exam-2019 AheAd";
int i;
for(i=0; a[i]!= '\0';i++)
{
if(a[i]>= 97 && a[i]<=122)
a[i] --;
else
if(a[i]>= '0' && a[i]<= '9')
a[i] = a[i -1];
else
if(a[i]>= 'A' && a[i]<= 'Z')
a[i]+ = 32;
else
a[i]= '#';
}
puts(a);
}
```

f. Observe the following C++ code and find out , which out of the given options i) to iv) are the expected correct output. Also assign the maximum and minimum value that can be assigned to the variable 'Go'. 2

```
void main()
{ int X [4] ={100,75,10,125};
int Go = random(2)+2;
for (inti = Go; i< 4; i++)
cout<<X[i]<<"$$";
}
```

i. 100$$75 ii. 75$$10$$125$$ iii. 75$$10$$ iv.10$$125$

2.a. Differentiate between data abstraction and data hiding. 2

b. Answer the questions (i) and (ii) after going through the following class: 2

```
class mammal{
public:
char category[20];
mammal( char xname[]) // function1
{
strcpy(category, xname)
```

```
}
mammal(mammal &t); //function2
};
```
(i) Create an object, such that it invokesfunction1.
(ii) Write complete definition for function2.

OR

Explain explicit and implicit call to parameterized constructor.

c. Define a class Sports in C++ with following descriptions: 4

Private members:

- S_Code of type long
- S_Name of type character array (String)
- Fees of type integer
- Duration of type integer

Public members:

- Constructor to assign initial values of S_Code as 1001, S_Name as "Cricket", Fees as 500, Duration 70
- A function NewSports() which allows user to enter S_Code, S_Name and Duration. Also assign the values to Fees as per the following conditions:

S_Name	Fees
Table Tennis	2000
Swimming	4000
Football	3000

- A function DisplaySports() to display all the details.

d. Give the following class definition answer the question that is follow: 4

```
class University
{  char name [20];
protected :
char vc[20];
public :
University();
void inputdata();
void outputdata();      } ;
class College : protected University
{  int regno;
protected:
char principal[20];
public :
int no_of_students;
void readdata();
College();
void displaydata ( );    };
class Department : public College
{ char name[20];
char HOD[20];
public :
```

```
void fetchdata(int);
Department();
void displaydata( );          } ;
void main()
{  Department  D; //Statement 1
_____ //Statement 2        }
```

i) Write Statement 2 to call function dispalydata( ) of class College from the object D of class Department.

ii) Write the names of all the data members, which are accessible from the member function readdata() belonging to class College.

iii) Write the names of all the members, which are accessible from the object of class Department.

iv) What will be the size of the objects belonging to class College and Department.

OR

```
class EAST
{ int ENo;
protected:
float Price;
public:
void E_Enter( );
void E_Display( );
}
```

Write a code in C++ to publically derive class 'SOUTH' from class 'EAST'. Class SOUTH has the following additional members :

Private Data Members :

Sname string , No_Of_Item integer

Protected data members :

Name string, SCost float

Public Member functions :

SINPUT( ) : To enter Sname, No_Of_Item

SOUTPUT( ) : To display the data members on the screen.

3.a. Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays only odd numbers divisible by 7 from the array. 2

If 2D array is

145	14	2	21	79
1	32	791	45	1000
35	678	2	3	28
9	18	273	2000	777

Output is : - 21, 791,35,273,777

OR

Write a function to interchange the second and third row of a 2 D array passed as arguments along with its row size and column size.

b. Write a C++ function that takes 1D array, its size and search element as arguments and implement binary search on the array. Function should return value 1 for successful search otherwise it should return value 0. 3

OR

Write a function SORTSCORE() in C++ to sort an array of structure Examinee in descending order of Score using Bubble Sort.

Note : Assume the following definition of structure Examinee.

struct Examinee

```
{ long RollNo;
char Name[20];
float Score;
};
```

c. An array Z[40][30] is stored in memory along the column with each of the elements occupying 4 bytes. Find out the base address and the address of the element Z[20][15], if an element Z[15][10] is stored at the memory location 7200. 3

OR

An array T [2..30][-3..20] is stored in the memory along the Column with each element occupying 4 bytes of storage. Find the base address and address of the element T[20][15], if an element T[9][10] is stored at the address 9800.

d. Write a function in C++ to insert a node containing Employee information, from a dynamically allocated stack of Employee implemented with the help of the following structure. 4

```
struct Employee
{
int ENo;
char CName[20];
Employee *Link;
};
```

OR

Consider the following portion of a program, which implements passengers Queue for a train. Write the definition of function QDelete( ), to delete a node from the queue.

```
struct NODE
{
long TicketNo;
char PName[20]; // Passenger Name
NODE *NEXT;
};
class TrainQueue
{
NODE *rear, *front;
public:
TrainQueue( ) { rear = NULL, front = NULL ;}
void QDelete ( );
~TrainQueue( );
};
```

e. Evaluate the following postfix expressions. Show the status of stack after execution of each operation separately : 2

20, 43,+ ,51 , - , 8 , 2 , / , 10 , * , -

OR

Convert the given infix expressions into its equivalent postfix form showing stack status at each step –

(i) A+C^(D+E)*F/G

4.a. Write a function CountYouMe( ) in C++ which reads the contents of a text file story.txt and counts the words You and Me (not case sensitive). For example, if the file contains: 2

You are my best friend.
You and me make a good team.
I will never lose a good friend like you.
And you never forget me.

The function should display the output as

Count for You: 4
Count for Me : 2

OR

Write a function Mycount( ) in C++ which reads the contents of a text file story.txt and copies the contents to another file ' newstory.txt' except the blank spaces.

b. Write a function in C++ to search and display details, whose destination is "Al SEEB" 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); get(To); }
void show( ) { cout<<Bno<< ":"<<From << ":" <<To<<endl; }
};
```

OR

Write a function in C++ to modify the destination of record whose Bus number is given by the user 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 Modify(){ gets(To); }
};
```

c. Observe the following program carefully and fill in the blanks using seekg( ) and tellg( ) functions: 1

```
#include<fstream.h>
class school
 { private :
char scode[10],sname[30];
 float nofstu;
public:
void INPUT( );
void OUTPUT( );
 int COUNTREC( );  };
int school::COUNTREC( )
{ fstream fin("scool.dat",ios::in|ios::binary);
_____ //statement 1 to move pointer to end of file
 int B=_____ //statement 2 to return no of bytes till current pointer position
 int C=B/sizeof(school);
 fin.close( );
 return C; }
```

OR

Write the statement to point to the 11th record of a file containing records of the structure 'employee' .

5 a. What is the difference between a Candidate key and Primary key? 2

b. **Consider** the two tables ***Book*** and ***Issued*** in the database as shown below: 4+2
rite the SQL query commands based on following table

Table : Book

Book_id	Book name	Author_name	Publisher	Price	Type	Quantity
C0001	Fast Cook	Lata Kapoor	EPB	355	Cookery	5
F0001	The Tears	William Hopkins	First Publi.	650	Fiction	20
T0001	My First c++	Brain & Brooke	FPB	350	Text	10
T0002	C++Brain works	A.W. Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Anna Roberts	First Publ.	750	Fiction	50

Table : Issued

Book_Id	QuantityIssued
T0001	**4**
C0001	**5**
F0001	**2**

Write SQL query for (1) to (4) and give the output for (5):

1) To show book name, Author name and price of books of First Pub. Publisher
2) To Display the names and price from books in ascending order of their prices.
3) To increase the price of all books of EPB publishers by 50.
4) To insert a new row in the table issued having the following data. 'F0003', 1

5) Give the output of the following :
i. Select Count(*) from Books ;
ii. Select Max(Price) from books where quantity >=15 ;
iii. Select book_name, author_name from books where publishers='first publ.';
iv. **Select count(distinct publishers) from books where Price>=400;**

6 a. State and prove Complementarity law. 2

b. Draw the logic circuit for the expression **(P+Q)'+Q.R'+P** 2

c. Write the SOP form of a Boolean function H, which is represented in a truth table as follows: 1

A	B	C	H
0	0	0	0

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

d. Reduce the following Boolean expression using KMap: 3

$F(X,Y,Z,W)=\pi(1,2,5,6,8,9,10,12,14,15)$

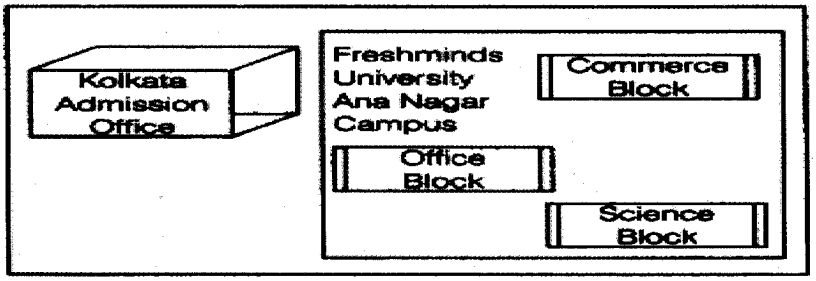
7.a. Which of the following come under cyber crime? 2
(i) Operating some one's Internet banking account, without his knowledge.
(ii) stealing a keyboard from someone's computer
(iii) Working on someone's computer with his/her permission.

b. Write one advantage of Star topology. 1

c. Difference between PAN and LAN. 1

d. Write the abbreviations in their full form : i) GSM ii)WLL. 2

e. Freshminds University of India is starting its first campus in Ana Nagar of South India with its centre admission office in Kolkata. The university has three major blocks comprising of Office block, Science block and Commerce block is in 5 km area campus. As a network expert, you need to suggest the network plan as per (i) to (iv) to the authorities keeping in mind the distance and other given parameters 4



Expected wire distance between various locations

Office Block to Science Block	90 m
Office Block to Commerce Block	80 m
Science Block to Commerce Block	15 m
Kolkata Admission Office to Ana Nagar Campus	2450 km

Expected number of computers to be installed at various locations in the university are as follows

Office Block	10
Science Block	140
Commerce Block	30
Kolkata Admission Office	8

i) Suggest the authorities, the cable layout amongst various blocks inside university campus for connecting the blocks.

ii) Suggest the most suitable place (i.e. block) to house the server for this university with a suitable reason.

iii) Suggest an efficient device from the following to be installed in each of the block to connect all the computers.
(a) Modem
(b) Switch
(c) Gateway

iv) Suggest the most suitable (very high speed) service to provide data connectivity between admission office located in Kolkata and the campus located in Ana Nagar from the following options:
- Telephone line
- Fixedline dial-up connection
- Coaxial cable network
- GSM
- Leased line
- Satellite connection.

End of the Question Paper

Roll Number		

SET B

INDIAN SCHOOL MUSCAT
SECOND PRELIMINARY EXAMINATION
COMPUTER SCIENCE

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

13.02.2019 | Max. Marks: 70

General Instructions:
(a) All questions are compulsory.
(b) Programming Language with C++
(c) *In Question 2(b, d) ,3 and 4 has internal choices.*

1.a) How is **#define** different from **const?** Explain. 2

b) 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; }
```

c) Rewrite the following code after removing syntactical error(s), if any. Underline each correction made. 2

```
#include<iostream.h>
void main( )
{
one = 10, two = 20;
call(one, two);
call(two);
}
void call(int n1, int n2 = 20)
{
n1 = n1 + n2
cout<<n1>>n2;
}
```

d) Write the output of the following C++ program code: 3
Note: Assume all required header files are already being included in the program.

```
void change(int *s)
{
for(int i=0;i<6;i++)
{
if(*s<40)
{
if(*s%2==0)
*s=*s+5;
else
```

```
*s=*s-4;
}
else
{
if(*s%2==0)
*s=*s+10;
else
*s=*s-3;
}
cout<<*s<<" ";
s++;
}
}
void main()
{ int score[]={4,12,34,21,45,16};
change(score);
}
```

e) Find the output of the following program. 2

```
# include<iostream.h>
# include<ctype.h>
#include<string.h>
void string_func (char* str)
{
int i, j, len=strlen (str);
for (i =0; i< len; i++)
{
for( j=0;j<=i; j++)
{
cout<<str[i];
cout<<endl;
}
}
void main ( )
{
string_func("Welcome");
}
```

f) Observe the following program carefully and attempt the given questions: 2

```
#include<iostream.h>
#include<conio.h>
#include<stdlib.h>
void main()
{
clrscr();
randomize();
char courses[][10]={"M.Tech","MCA","MBA","B.Tech"};
int ch;
for(int i=1;i<=3;i++)
{
ch=random(i)+1;
cout<<courses[ch]<<"\t";
```

```
}
getch();
}
```

I. Out of all the four courses stored in the variable courses, which course will never be displayed in the output and which course will always be displayed at first in the output?

II. Mention the minimum and the maximum value assigned to the variable ch?

2.a) Define a) Encapsulation b) Function Overloading 2

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

OR

Answer the questions (i) and (ii) after going through the following class Complex:

```
{
int img;
int real;
public:
Complex(); //function 1
Complex(int , int ); //function 2
~Complex(); //function 3
};
```

(i) What is function3 known as? When will it be invoked in a class?

(ii) write the statements to invoke function 2 and 3.

c) Define a class DanceAcademy in C++ with following description: 4

Private Members

- Enrollno of type int
- Name of type string
- Style of type string
- Fee of type float
- A member function chkfee( ) to assign the value of fee variable according to the style entered by the user according to the criteria as given below:

Style	**Fee**
Classical	10000
Western	8000
Freestyle	11000

Public Members

- A function enrollment() to allow users to enter values for Enrollno,Name, Style and call function chkfee()to assign value of fee variable according to the Style entered by the user.
- A function display() to allow users to view the details ofall 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 is illustrated in the above declaration?
ii) Name the data members accessed by object of class Bill.
iii) Write the names of all the data members, which are directly accessible from the member functions of class Paint.
iv) Write the names of all the member functions, which are directly accessible from an object of class Bill.

OR

Consider the following class furniture :

```
class furniture
{
char name[30];
float cost;
protected :
int FNO;
public :
furniture( )
 { FNO=999;
cost= 0}
void INPUT( )
{ cin>>FNO;
gets(name);
cin>>cost;  }
float getcostl()
{ return cost;
}
};
```

Write a code in C++ to publically derive class 'Interior' from class 'furniture'. Class Interior has the following additional members :
Private Data Members :
Fname string , No_Of_Item integer

Protected data members :
Name string, FCost float
Public Member functions :
FINPUT( ) : To enter Dname, No_Of_mem ,
FOUTPUT( ) : To display the data members on the screen.

3.a) Write a user-defined function SUM(int A[][5], int R, int C) in C++ to find and display the sum of all the values, which are ending with 6 (i.e., unit place is 6). 2

22	34	56	6	160
68	16	77	96	45

The output should be : **Sum of the numbers ending with 6 = 158.**

OR

Write a user-defined function SUM(int A[][5], int R, int C) in C++ to find and display the sum of each column of the 2-d array.

b) What will be the status of following list after third pass of selection sort used for arranging elements in ascending order: 3
40, 67, -23, 11, 27, 38, -1
Also write a function SORTING which receives an array x and its size n and sort the using insertion sort.

OR

What will be the status of following list after third pass of insertion sort used for arranging elements in descending order:
40, 67, -23, 11, 27, 38, -1
Also write a function SORTING which receives an array x and its size n and sort the using selection sort.

c) Let us assume Data[20][15] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 2 bytes. Find the address of the element Data[10][5], if the element Data[15][10] is stored at the memory location15000. 3

OR

A double C++ type array A[20][4..15] is stored in the memory along column with the base address as 1000.Find out the address of the element Array[12][7].

d) Write the definition of a member function PopPacket() for a class STACK in C++, to remove/delete a Packet from a dynamically allocated QUEUE of Packet. Consider the following code is already written as a part of the program. 4

```
struct Packet
{
int PID;
char Address[20];
Packet *LINK;
};
class STACK
{
Packet *Top;
public:
STACK(){Top=NULL;}
```

```
void PopPacket();
~STACK ();
};
```

OR

Write a function to delete the elements in the circular queue score at any point of time :

```
class score
{
int value[10];
int rear,front;
};
```

e) Convert the given infix expressions into its equivalent postfix form showing stack status at each step – 2

False && True || ! (False||True)

OR

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

2,13, + , 5, -,6,3,/,5,*,+

4.a) Write a function in C++ to count and display the number of five letter words in the file "story.txt". 2

OR

Write a function in C++ to display the lines having more than 20 letters in the file "story.txt".

b) 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;  }
float 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.

OR

Given the binary file CAR.DAT, containing records of the following class CAR type:

```
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; }
float RETURN_Milage( )
{ return Milage; } };
```

Write a function in C++, that would delete the records of cars with mileage between 100 to 150 from the file CAR.DAT .

c) Write the command to place the file pointer at the 10^{th} record starting position using seekp() or seekg() command. InFile is an object of above class 'CAR' and record name is 'CAR_INFO'. 1

OR

Fill in the blanks marked as Statement 1 and statement 2 in the below code according to the context:

```
#include <fstream.h>
class Customer
{
int Cno;
char Cname[20];
public:
//Function to count the total number of records
int Countrec();
};
int Customer::Countrec()
{
fstream f;
f.open("Cust.dat",ios::binary|ios::in);
_____ //Statement 1
int Bytes =_____ //Statement 2
int count = Bytes / sizeof(Customer);
f.close();
return count;
}
```

5 a. Consider the following table and answer the questions: 2

Table : *Book*

Book_id	Book name	Author_name
C0001	Fast Cook	Lata Kapoor
F0001	The Tears	William Hopkins
T0001	My First c++	Brain & Brooke
T0002	C++ Brain works	A.W. Rossaine

i) Suggest the most suitable attribute that can be selected as primary key.
ii) What is the degree and cardinality of the above table.

b. **Consider** the two tables GRADUATE and GUIDE in the database as shown below: 4+2
Write SQL commands for 1 to 4 and outputs for 5 to 8.

TABLE: GRADUATE

S.NO	NAME	STIPEND	SUBJECT	AVERAGE	DIV
1	KARAN	400	PHYSICS	68	I
2	DIWAKAR	450	COMP. Sc.	68	I
3	DIVYA	300	CHEMISTRY	62	I
4	REKHA	350	PHYSICS	63	I
5	ARJUN	500	MATHS	70	I
6	SABINA	400	CEHMISTRY	55	II
7	JOHN	250	PHYSICS	64	I

8	ROBERT	450	MATHS	68	I
9	RUBINA	500	COMP. Sc.	62	I
10	VIKAS	400	MATHS	57	II

Table: GUIDE

MAINAREA	ADVISOR
PHYSICS	VINOD
COMPUTER SC	ALOK
CHEMISTRY	RAJAN
MATHEMATICS	MAHESH

1. List the names of those students who have obtained **DIV I** sorted by NAME.
2. To insert a new row in the GRADUATE table:
   11,"KAJOL", 300, "COMP. SC.", 75, 1
3. To display the NAME and ADVISOR from the two tables.
4. To display the Maximum AVERAGE value for each DIV.

Give the output of following sql statements:

5. Select MIN(AVERAGE) from GRADUATE where SUBJECT="PHYSICS";
6. Select SUM(STIPEND) from GRADUATE WHERE div=2;
7. Select AVG(STIPEND) from GRADUATE where AVERAGE>=65;
8. Select COUNT(distinct SUBDJECT) from GRADUATE;

6 a. State and prove De Morgan's second theorem. 2

b. Draw the logic circuit for the expression **Y= AB+BC'+C'A'** 2

c. Write the SOP form of a Boolean function F, which is represented in a truth table as follows: 1

U	V	W	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

d. Reduce the following Boolean expression using K-Map: 3
$F(A,B,C,D)=\prod(0,1,3,5,6,7,10,14,15)$

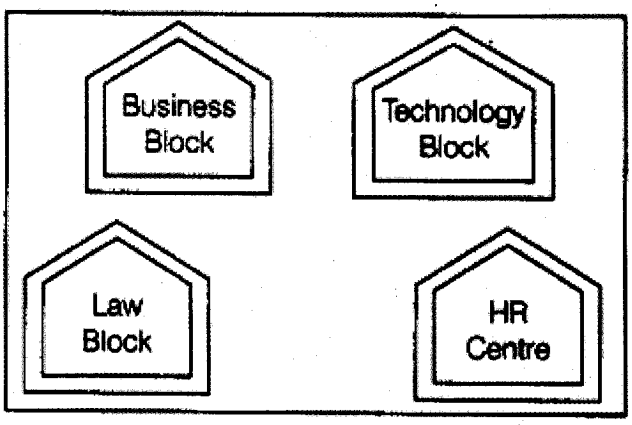
7.a. Write the full forms of the following. 2
(i) FTP (ii) GPRS

b. Write one disadvantage of Star topology. 1

c. What is repeaters? 1

d. What is the difference between MAN and WAN. 2

e. Quick Learn University is setting up its academic blocks at Prayag Nagar and planning to set-up a network. The university has three academic blocks and one human resource centre as shown in the diagram below: 4



Centre to centre distance between various blocks/centre is as follows:

Law Block to Business Block	40 m
Law Block to Technology Block	80 m
Law Block to HR Centre	105 m
Business Block to Technology Block	30 m
Business Block to HR Centre	35 m
Technology Block to HR Centre	15 m

Number of computers in each of the blocks/centre is follows:

Law Block	15
Technology Block	40
HR Centre	115
Business Block	25

i) Suggest the most suitable place (i.e. block/centre) to install the server of this university with a suitable reason.
ii) Suggest an ideal layout for connecting these block/centre for a wired connectivity.
iii) Which device will you suggest to be placed/installed in each of these blocks/centre to efficiently connect all the computers with in these blocks/centre ?
iv) The university is planning to connect its admission office in the closest big city, which is more than 250 km from university, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

End of the Question Paper