Roll Number		

SET A

INDIAN SCHOOL MUSCAT
FINAL TERM EXAMINATION
COMPUTER SCIENCE

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

13.11.2018 Max. Marks: 70

General Instructions:
(A) All questions are compulsory where internal choice is given attempt accordingly.
(B) Programming Language : C++ .

1. a Answer the questions (i) to (iv) after going through the following class: 4

```
class Person
{
char Name[30];
protected:
char Address[20];
public:
double income;
Person( );
void read_Person ();
void disp_Person( );
};
class Employee : protected Person
{
int  ENo;
protected:
float Salary;
long bonus ;
public:
Employee( );
void read_Employee( );
void disp_Employee( );
};
class Student : private Person
{  int  RollNo;
float  Marks;
public:
Student( );
void read_Sudent( );
void disp_Student ();      };
```

(i) Which type of Inheritance is shown in the above example?
(ii) Mention the name of ALL members that are accessible by the member function of class Employee.
(iii) Mention the name of member functions that are accessible by the object of class

Student.
(iv) How many bytes will be required by an object of class Employee?

OR

Consider the following class STAFF :

```
class STAFF
{ int Sn;
char Sname[30];
float salary;
public :
STAFF( )
 { Sn=-1;
Salary= 0}
void INPUT( )
{ cin>>Sn;
gets(name);
cin>>salary;   }
float getsal()
{ return salary;
}
};
```

Write a code in C++ to publically derive class 'Physics' from STAFF. Class Physics has the following additional members :
Private Data Members :
Pname string , Num_teachers integer
Public Member functions :
Pinput( ) : To enter Pname, Num_teachers
Poutput( ) : To display the data members on the screen.

b. Write a function in C++ to count and display the no of words with third letter 'e' in the file VOWEL.TXT. Example: If the file contains: 2
Boy is playing there with the green ball. I love to eat ice cream. A plane is in the sky.
Then the output should be: 4

OR

Write a function in C++ to display all lowercase letters from a file "Demo.txt".

c. Given a binary file PHONE.DAT, containing records of the following structure type 3

```
class Phonlist
{ char Name [20], Address[30];
char  AreaCode[5], PhoneNo[15] ;
public:
void Register () ;
void Show ( ) ;
int CheckCode (char AC [ ])
{
return strcmp (AreaCode, AC) ; }
};
```

Write a function TRANSFER ( ) in C++, that would copy all those records which are having AreaCode as "DEL" from PHONE.DAT to PHONBACK.DAT.

OR

Observe the program segment carefully and answer the question that follows:

```
class student
{
int student_no;
char student_name[20];
int mark;
public:
void enterDetails( )
{
cin>> student_no>> mark ;
gets(student_name);
}
void showDetail( );
int get_mark( )
{ return mark;}
};
```

Assuming a binary file "RESULT.DAT" contains records belonging to student class, write a user defined function to separate the records having mark

(i) Greater than 79 into "EXCELLENT.DAT" file

(ii) Greater than 59 but less than 80 into "AVERAGE.DAT" file.

(iii) Remaining records should be in "RESULT.DAT" file.

d. Name the offset positions used in seekg(), seekp () functions. 1

OR

Explain the use of ios::binary file mode.

2 a. Write a function MERGE() which takes two integer arrays X & Y and their sizes 'r' and 's' respectively as parameters where X is sorted in descending order and Y is sorted in ascending order. The function should produce a third array Z in descending order using mergesort. 2

OR

Write a function which takes a 1D array ARR[] and its size 'n' as arguments and sorts the array in ascending order using insertion sort.

b. Write a function in C++ to print the sum of all the values which are either divisible by 3 or are divisible by 5 present in a two dimensional array passed as the argument to the function. 3

OR

Write a function which prints the elements in reverse order for each row of a 2-D matrix of size mXn where the matrix , and sizes are passed as parameters.

c. Convert the given infix expressions into its equivalent postfix form showing stack status at each step – 2 x2

(i) A - B * (C + D) ^ E / F (ii) NOT A OR NOT B AND NOT C

d. Evaluate the following postfix expressions showing the stack contents at each stage : 2x2

(i) True,True,NOT,AND,False,OR,False,AND

ii) 10 ,20, +, 25, 15 ,-, *, 30, /

e. An array S[40][30] is stored in the memory along the row with each of the element occupying 4 bytes, find out the memory location for the element S[15][5], if an element S[20][10] is stored at memory location 5700. 2

OR

An array X[30][10] is stored in the memory with each element requiring 4 bytes of storage ,if the base address of X is 6000, find out memory location of X[15][12], if the content is stored along

the row.

3 a. An array A [-1..10][-4..20] is stored in the memory along the column with each element occupying 2 bytes of storage. Find the address of the element A[6][13], if the base address is 4000. 2

b. Consider the following structure for a stack implemented as linked list. 3

```
struct exam
{
int rollno;
int marks;
exam *next;
};
```

Write a function in C++ to push a node into the stack implemented with the above structure.

OR

Write a function in C++ to delete a node containing exam information, from a dynamically allocated Queue of exam implemented with the help of the following structure.

```
struct exam
{
int rollno;
int marks;
exam *next;
};
```

c. Write a function in C++ to delete an element containing ITEM information ,from a statically allocated **queue** implemented with the help of the following class : 3

```
class Shop
{
int SNO;
char SName[20];
public :
//member functions
};
```

d. Write the definition of a member function Insert() for a class CircQue in C++, to add a Student in a statically allocated circular queue of songs considering the following code is already written as a part of the program: 3

```
struct Song
{   long Slno;
char Title[20];
};
class CircQue
{
Song S[30];
int Front, Rear;
public:
CircQue( )
{
Front = -1;
Rear = -1;
}
```

void Insert(); // To add Student in a static circular queue
};

4 a. Define a) Candidate key b) Primary key 2

b. Consider the following table and answer the questions: 2

TABLE: GRADUATE

SNO	NAME	SUBJECT	DIV
1	KARAN	PHYSICS	I
2	DIWAKAR	COMP. Sc.	I
3	DIVYA	CHEMISTRY	I
4	REKHA	PHYSICS	I
5	ARJUN	MATHS	I

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

c. Consider the following tables EMPLOYEES and EMPSALARY. Write SQL commands for the statements (1) to (6) and give outputs for SQL queries (7) to (10). 6+2

Table: EMPLOYEES

Empid	Firstname	Lastname	Address	City
010	Ravi	Kumar	Raj nagar	GZB
105	Harry	Waltor	Gandhi nagar	GZB
152	Sam	Tones	33 Elm St.	Paris
215	Sarah	Ackerman	440 U.S. 110	Upton
244	Manila	Sengupta	24Friends street	New Delhi
300	Robert	Samuel	9 Fifth Cross	Washington
335	Ritu	Tondon	Shastri Nagar	GZB
400	Rachel	Lee	121 Harrison St.	New York
441	Peter	Thompson	11 Red Road	Paris

Table: EMPSALARY

Empid	Salary	Benefits	Designation
010	75000	15000	Manager
105	65000	15000	Manager
152	80000	25000	Director
215	75000	12500	Manager
244	50000	12000	Clerk
300	45000	10000	Clerk
335	40000	10000	Clerk
400	32000	7500	Salesman
441	28000	7500	Salesman

Write the SQL commands for the following :

1. To show Firstname,Lastname,Address and city of all employees living in Paris
2. To display the content of Employees table in descending order of Firstname.
3. To display the Firstname,Lastname and total salary of all managers from the tables Employee and empsalary , where total salary is calculated as salary+benefits.

4. To display the maximum salary among managers and clerks from the table Empsalary.
5. To display the details of Employees whose first name starts with the letter 'R'.
6. To add a new column called Commission (integer type)to EMPSALARY table.

Give the Output of following SQL commands:

7. SELECT FIRSTNAME,SALARY FROM EMPLOYEES ,EMPSALARY WHERE DESIGNATION = 'SALESMAN' AND EMPLOYEES.EMPID=EMPSALARY.EMPID;
8. SELECT COUNT(DISTINCT DESIGNATION) FROM EMPSALARY;
9. SELECT DESIGNATION, SUM(SALARY) FROM EMPSALARY GROUP BY DESIGNATION HAVING COUNT(*) >2;
10. SELECT SUM(BENEFITS) FROM EMPSALARY WHERE DESIGNATION ='CLERK';

5 a. State and prove Involution law. 2

b. Draw the logic circuit for the expression (A'B+B'C'+AC' 2

c. Write the SOP & POS form of a Boolean function X, which is represented in a truth table as follows: 2

P	Q	R	X
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

d. Obtain the minimal POS form for the following boolean expression using KMap. F(c,d,e,f) $=\sum$ (0,2,3,5,7,8,10,11,13,15) 3

e. Obtain the reduced form for the following boolean expression using KMap. F(U,V,W,X) = π (0,3,4,5,7,8,9,10,11,13,14) 3

6.a. What is a firewall? 1

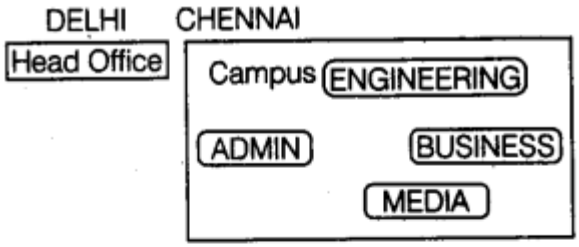
b. Name any two guided transmission media in networks. 1

c. Explain the use of the following devices a) Router b) Bridge 2

d. Write the full forms of the following. 2
(i) CSMA (ii) HTTP

e. Perfect Edu Services Ltd. is an educational organisation. It is planning to set-up its India campus at Chennai-with its head office at Delhi. The Chennai campus has 4 main buildings-ADMIN, ENGINEERING, BUSINESS and MEDIA. 4

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 distance between the buildings and other given parameters.



Shortest distance 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 m

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 (of the 4 buildings), to get the best connectivity for maximum number of computers. Justify your answer.

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

iii. Suggest the most suitable guided media to connect the buildings inside Chennai campus.

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?
(a) Cable TV
(b) E-mail
(c) Video Conferencing
(d) Text Chat

End of the Question Paper