INDIAN SCHOOL DARSAIT
FIRST TERM EXAM- SAMPLE PAPER I
COMPUTER SCIENCE (083)

Class: XII   Max.Marks: 70

General Instructions:

    (i)   *All questions are compulsory.*

1. a)   Explain in brief the purpose of function prototype with the help of a suitable example.   2

    b)   Jayapriya has started learning C++ and has typed the following program. When she compiled the   1
following code written by her, she discovered that she needs to include some header files to
successfully compile and execute it. Write the names of those header files, which are required to
be included in the code.

```
void main(){
 float A,Number,Outcome;
 cin>>A>>Number;
 Outcome=pow(A,Number);
 cout<<Outcome<<endl;}
```

    c)   Rewrite the following C++ code after removing any/all syntactical errors with each   2
correction underlined.

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

```
#define Equation(p,q)=p+2*q
 void main(){
 float A=3.2;B=4.1;
 C=Equation(A,B);
 cout<<'Output='<<C<<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.

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

e) Find the output of the following program : 3

```cpp
void in(int x,int y, int &z)
{ x+=y;
y—;
z*=(x–y);}
void out(int z,int y, int &x)
{ x*=y;
 y++;
z/=(x+y);}
void main()
{ int a=20, b=30, c=10;
 out(a,c,b);
cout<<a<<"#"<<b<<"#"<<c<<"#"<<endl;
in(b,c,a);
cout<<a<<"@"<<b<<"@"<<c<<"@"<<endl;
out(a,b,c);
cout<<a<<"$"<<b<<"$"<<c<<"$"<<endl;}
```

2. a) How does OOP overcome the shortcoming of traditional programming approaches? 1

b) What is the difference between #define and const? Explain with a suitable example. 2

c) Rewrite the following program after removing the errors. Also underline each error corrected: 2

```cpp
#include<iostream.h>
void main(){
struct movie{
char movie_name[20];
char movie_type;
int ticket_cost=100;
}movie;
gets(movie_name);  gets(movie_type);}
```

d) Look at the following C++ code and find the possible output(s) from the options (i)to (iv) 2
following it. Also, write the maximum and the minimum values that can be
assigned to the variable CHANGER.

```cpp
void main(){
 randomize();
 int CHANGER;
 CHANGER=random(3);
 char CITY[][25]={"DELHI","MUMBAI","KOLKATA","CHENNAI"};
 for(int I=0;I<=CHANGER;I++){
 for(int J=0;J<=I;J++)
 cout<<CITY[J];
 cout<<endl; }}
```

(i)	(ii)
DELHI	DELHI
DELHIMUMBAI	DELHIMUMBAI
DELHIMUMBAIKOLKATA	DELHIMUMBAIKOLKATA
	DELHIMUMBAIKOLKATACHENNAI
(iii)	(iv)
MUMBAI	KOLKATA
MUMBAIKOLKATA	KOLKATACHENNAI
MUMBAIKOLKATACHENNAI	

e) Find the output of the following program: 3
```
struct GAME
{ int Score, Bonus;};
void Play(GAME &g, int N=10){
g.Score++;
g.Bonus+=N;}
void main(){
GAME G={110,50};
Play(G,10);
cout<<G.Score<<":"<<G.Bonus<<endl;
Play(G);
cout<<G.Score<<":"<<G.Bonus<<endl;
Play(G,15);
cout<<G.Score<<":"<<G.Bonus<<endl;}
```

3. a) How encapsulation and abstraction are implemented in C++ language? Explain with an example 2

   b) What is the difference between private and public visibility modes? 2
   c) What is the difference between multiple and multilevel inheritance? Explain with example. 3
   d) What is a virtual base class? Explain with an example. 3

4. a) Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary files 2
   are included:
```
class FICTION{
 long FCode;   char FTitle[20];   float FPrice;
 public:
FICTION() //Member Function 1
 {
 cout<<"Bought"<<endl;
 FCode=100;strcpy(FTitle,"Noname");FPrice=50;}
 FICTION(int C,char T[],float P) // Member Function 2
 {
 FCode=C;
 strcpy(FTitle,T);
 FPrice=P;}
 void Increase(float P) // Member Function 3
 {
 FPrice+=P;}
 void Show() // Member Function 4
 {
 cout<<FCode<<":"<<FTitle<<":"<<FPrice<<endl;}
 ~FICTION() // Member Function 5
 {
 cout<<"Fiction removed!" <<endl;}};
 void main() //Line 1
 {              //Line 2
 FICTION F1,F2(101,"Dare",75); //Line 3
 for (int I=0;I<4;I++) //Line 4
 { //Line 5
 F1.Increase(20);F2.Increase(15); //Line 6
 F1.Show();F2.Show(); //Line 7
 } //Line 8
 } //Line 9
```
   (i) Which specific concept of object oriented programming out of the following is illustrated

by Member Function 1 and Member Function 2 combined together ?

    (ii)   How many times the message "Fiction removed!" will be displayed after executing the above C++ code ? Out of Line 1 to Line 9, which line is responsible to display the message "Fiction removed!"?

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

Private Members
- MCode //Data member for Code (an integer)
- MName //Data member for Name (a string)
- MPop //Data member for Population (a long int)
- Area //Data member for Area Coverage (a float)
- PopDens //Data member for Population Density (a float)
- CalDen() //A member function to calculate Density as mpop/Area

Public Members
- Enter() //A function to allow user to enter values of Mcode,MName,MPop,Area and call
          //CalDen() function
- ViewALL() //A function to display all the data members also display a message "Highly
            //Populated Area" if the Density is more than 12000

c)   Answer the following questions that follow: 4

```
class indoor_sports{
 int i_id;
 char i_name[20];
 char i_coach[20];
protected:
 int i_rank,i_fee;
 void get_ifee();
public:
 indoor_sports();
 void iEntry();
 void ishow();};
class outdoor_sports{
 int o_id;
 char o_name[20];
 char o_coach[20];
protected:
 int orank,ofee;
 void get_ofee();
public:
 outdoor_sports();
 void oEntry();
 void oshow();};
class sports:public indoor_sports,protected outdoor_sports{
 char rules[20];
 public:
 sports();
 void registration();
 void showdata();};
```

    (i)   Name the type of inheritance illustrated in the above C++ code.

    (ii)   Write the names of all the members, which are accessible from the objects belonging to class outdoor_sports.

    (iii)   Write the names of all the member functions, which are accessible from the member function of class sports.

    (iv)   What will be the size of the object belonging to class indoor_sports?

5. a) Write a function in C++ to count and display the no of three letter words in the file "VOWEL.TXT". 2
   Example:
   If the file contains:
   A boy is playing there. I love to eat pizza. A plane is in the sky.
   Then the output should be: 4

   b) Write a function in C++ to search for a BookNo from a binary file "BOOK.DAT", assuming the 3
   binary file is containing the objects of the following class.
   ```
   class BOOK
   {
   int Bno;
   char Title[20];
   public:
    int RBno(){return Bno;}
   void Enter(){cin>>Bno;gets(Title);}
   void Display(){cout<<Bno<<Title<<endl;}};
   ```

   c) 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;  }
    int 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 and 150(inclusive of both the values).

   d) Find the output of the following C++ code considering that the binary file sp.dat already exists on 2
   the hard disk with 2 records in it.
   ```
   class sports{
    int id;
    char sname[20];
    char coach[20];
    public:
    void entry();
    void show();
    void writing();
    void reading();}s;
    void sports::reading(){
    ifstream i;
    i.open("sp.dat");
    while(1)
    break;
    else
    cout<<"\n"<<i.tellg(); }
    i.close();}
    void main(){
    s.reading();}
   ```

6. a) Observe the following STUDENTS and EVENTS tables carefully and write the name of the 2

RDBMS operation which will be used to produce the output as shown in LIST. Also, find the
Degree and Cardinality of the LIST.

STUDENTS

NO	NAME
1	Tara Mani
2	Jaya Sarkar
3	Tarini Trikha

EVENTS

EVENTCODE	EVENTNAME
1001	Programming
1002	IT Quiz

LIST

NO	NAME	EVENTCODE	EVENTNAME
1	Tara Mani	1001	Programming
1	Tara Mani	1002	IT Quiz
2	Jaya Sarkar	1001	Programming
2	Jaya Sarkar	1002	IT Quiz
3	Tarini Trikha	1001	Programming
3	Tarini Trikha	1002	IT Quiz

b) Observe the following table carefully and write the names of the most appropriate   2
columns, which can be considered as (i) candidate keys and (ii) primary key

Id	Product	Qty	Price	Transaction Date
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

C) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on   6
the tables

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 NO, NAME, TDATE from the table TRAVEL in descendingorder of NO.

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

(iii)   To display the NO and NAME of those travellers from the table TRAVELwho 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 TRAVELGROUP BY CODE HAVING COUNT(*)>1;

(vi)   SELECT DISTINCT CODE FROM TRAVEL;

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

(viii) SELECT NAME,KM*PERKMFROM TRAVEL A, VEHICLE BWHERE A.CODE=B.CODE AND A.CODE='105';

7. a) Verify the following using Boolean Laws:
    i)A'+ B'.C=A'.B'.C'+ A'.B.C'+ A'.B.C + A'.B'.C+ A.B'.C   2

    ii) $X + Y' = X.Y+X.Y'+X'.Y'$

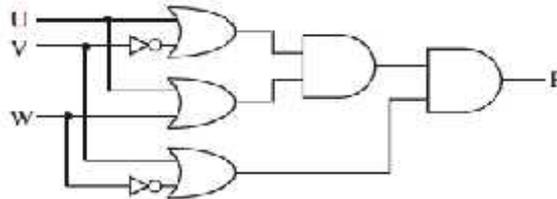   2

    b) Write the Boolean Expression for the result of the Logic Circuit as shown below: 2

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

P	Q	R	F (P, Q, R)
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

    d) Reduce the following Boolean Expression to its simplest form using K-Map: 3
        $$F(X,Y,Z,W) = (2,6,7,8,9,10,11,13,14,15)$$