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**INDIAN SCHOOL MUSCAT
FIRST PRELIMINARY EXAMINATION
SUBJECT : COMPUTER SCIENCE**

CLASS: XII
14.12.2017

Sub. Code: 083

Time Allotted: 3 Hrs
Max. Marks: 70

MARKING SCHEME WITH VALUE POINTS

General Instructions:

- i) All questions are compulsory.
- ii) Programming Language : C++
- iii) Assume all header files are included in the output questions.

1. a) Write the names of the header files, which is/are essentially required to run/ execute the following C++ code: 1

```
typedef char STRING[80];
void main( )
{
    STRING Txt[] = "We love Peace"; int Count=0;
    while (Txt[Count]!='\0')
    {
        if (isalpha(Txt[Count]))
            Txt[Count++] = '@';
        else
            Txt[Count++] = '#';
    }
    puts (Txt);
}
```

Answer: #include<stdio.h> (½ Mark each)
#include<ctype.h>

- b) What is the benefit of giving default parameter/argument in a function? Give a suitable example to illustrate its use. 2

Answer: The benefit of using default argument is that whenever there is no value supplied to the parameter within the program, its default value can be used (1 mark).
Example: Any example showing the working of a default argument (1 mark).

- c) **Answer:** iii. 100#50#200# (1 mark , working should be shown) 2

Minimum value for the variable Taker = 2

Maximum value for the variable Taker = 3

- d) Rewrite the following code after removing all the syntax error(s) if any present in the code. Make 2

sure that you underline each correction done by you in the code. Assume that all required header files are already included, which are essential to run this code

```
#Define MaxSpeed = 60.5;
void main( )
{
    int MySpeed ;
    char Alert='N' ;
    cin»MySpeed ;
    if MySpeed > MaxSpeed
        Alert = 'Y' ;
    cout<<Alert<<endl;
}
```

Answer:

```
#define MaxSpeed 60.5           //3 errors ( ½ mark each)
void main( )
{
    int MySpeed ;
    char Alert='N' ;
    cin»MySpeed ;
    if ( MySpeed > MaxSpeed ) // 4th error
        Alert = 'Y' ;
    cout<<Alert<< endl;        // 5th error
}
```

e) Find the output of the following program:

3

```
class Eval
{
    char Level;
    int Point;
public:
    Eval( ) { Level = 'E' ; Point = 0; }
    void Sink(int L)
    {
        Level - = L;
    }
    void Float(int L)
    {
        Level += L;
        Point++;
    }
    void Show()
    {
        cout<<Level<< "#" << Point<<endl;
    }
};
void main( )
{
    Eval E;
```

```

        E.Sink(3);
        E.Show();
        E.Float(7);
        E.Show();
        E.Sink(2);
        E.Show();
    }

```

Answer:

Output (For correct output in each line – 1 mark each)

B#0

I#1

G#1

2. a) Mention any two advantages of OOPs. 1

Answer: (Any two- ½ mark each)

- 1) Reusability of existing code
- 2) Ease of comprehension
- 3) Ease of fabrication and maintenance
- 4) Easy redesign and extension

- b) What do you mean by Inheritance and Polymorphism? 2

Answer: (1 mark each)

Inheritance is the capability of one class of things to derive capabilities or properties from another class.

Polymorphism is the ability for a message or data to be processed in more than one form.

- c) What is the difference between a class and an object? 2

Answer: (1 mark each)

A class is a group of objects that share common properties and relationship.

An object is an identifiable entity with some characteristics and behaviour.

3. What is function overloading? Explain with an example. 2

Answer:

A function having several definitions that are differentiable by the number or types of their arguments is known as overloading of functions. (1 mark)

Example: (1 mark)

```
void add(int a, int b);
```

```
void add(int a, float b) ;
```

```
void add(float a, float b) ;
```

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

Private Members :

A data member Busno (to store bus number) of type integer.

A data member From (to store place name of origin) of type string.

A data member To (to store place name of destination) of type string.

A data member Type (to store bus type such as 'O' for ordinary) of type char.

A data member Distance (to store the distance in KM) of type float.

A data member Fare (to store the bus fare) of type float.

Public members:

A constructor to assign default values to data members: Busno=1222, From -“Delhi”, To- “Amritsar”, Type – ‘O’ , Distance = 1100 , Fare = 1650

A member function CalcFare() to allow users to calculate the fare as per the following criteria:

Type	Fare
‘O’	1.5 * Distance
‘E’	2.5 * Distance
‘L’	3.5 * Distance

A member function Allocate() to allow user to enter values for Busno, From, To, Type and Distance.

A member function Display() which calls the function CalcFare() and display all the details.

Answer: (1 mark for proper class definition and constructor and 1 mark each for 3 functions)

```
class BUS{
    int Busno ;
    char From[25] ;
    char To[25] ;
    char Type ;
    float Distance, fare ;
public:
    BUS()
    { Busno = 1222 ;
      strcpy(From , “Delhi”) ;
      strcpy(To , “Amritsar”) ;
      Type = ‘O’ ;
      Distance = 1100 ;
      Fare = 1650 ;
    }
    void CalcFare()
    { if(Type== ‘O’)
      Fare = 1.5 * Distance ;
      else if(Type== ‘E’)
      Fare = 2.5 * Distance ;
      else if(Type== ‘L’)
      Fare = 3.5 * Distance ;
    }

    void Allocate()
    { cout<< “Enter the bus number :” ;
      cin>>Busno ;
      cout<< “ Enter the starting location :” ;
      gets(From) ;
      cout<< “ Enter the destination :” ;
      gets(To) ;
      cout<< “Enter type(O/E/L):” ;
      cin>>Type ;
      cout<< “ Enter the distance :” ;
      cin>>Distance ;
    }
}
```

```
}
```

```
void Display()  
{ Calfare() ;  
  cout<< "Bus number :"<<Busno ;  
  cout<< "Starting Point:"<<From ;  
  cout<< "Destination:"<<To ;  
  cout<< "Type:"<<Type ;  
  cout<< "Distance:"<<Distance;  
  cout<< "Fare:"<<Fare ;  
}  
};
```

5. Answer the questions(i) and (iii) after going through the following class:

3

```
class Passenger  
{ long int PNR;  
  char Name[20] ;  
public:  
  Passenger( )                // Function 1  
  { cout<<"Ready"<<endl; }  
  
  void Passengr(long P,char N[ ] )    // Function 2  
  { PNR = P; strcpy(Name, N); }  
  
  void Print( )                  // Function 3  
  { cout<<PNR << Name <<endl; }  
  
  ~Passenger( )                // Function 4  
  { cout<<"Booking cancelled!"<<endl; }  
};
```

- i) Write suitable C++ statements to invoke Function 2.
- ii) Write suitable C++ statement to invoke Function 3.
- iii) What is Function 4 referred as? When will it be invoked?

Answer: (1 mark each)

- i) Passenger P; P.Passengr(3456768, "Rajesh") ;
- ii) Passenger P ; P.Print() ;
- iii) Destructor, It is invoked when the object get out of scope.

6. Answer the questions (i) to (iv) based on the following:

4

```
class Interior  
{  
  int OrderId ;  
  char Address[20] ;  
protected:
```

```

        float Advance;
public:
    Interior( ) ;
    void Book( ) ;
    void View( ) ;
};
class Painting : public Interior
{
    int WallArea, ColorCode ;
protected:
    char Type;
public:
    Painting( ) ;
    void PBook( ) ;
    void PView( ) ;

};
class Billing : public Painting
{
    float Charges;

    void Calculate( );
public:
    Billing( ) ;
    void Bill( ) ;
    void BillPrint( ) ;
};

```

- 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 Painting.
- iii) Write the names of all the member functions, which are directly accessible from an object of class Billing.
- iv) What will be the order of execution of the constructors, when an object of class Billing is declared?

Answer: (1 Mark each) – No marks to be given for less information or more information.

- i) Multi Level Inheritance
- ii) WallArea,ColorCode,Type,Advance
- iii) Bill(),BillPrint(),PBook(), PView(),Book(),View()
- iv) Interior, Painting,Billing

7. a) Write a function definition for TOWER() in C++ to read the content of a text file WRITEUP.TXT to count the presence of the word TOWER and display the number of occurrences of this word. 2

Note:

- The word TOWER should be an independent word
- Ignore type cases (i.e. lower/upper case).

Answer: (½ mark for function header, 1 mark for the logic ½ mark for the correct output)

```
void TOWER( )
{ char word[25] ;
  int ct = 0 ;
  ifstream fin("WRITEUP.TXT") ;
  fin>>word ;
  while( fin )
  { if( strcmpi("TOWER",word) == 0)
    ct++ ;
    fin>> word ;
  }
  fin.close( ) ;
  cout<< "The number of occurrences of the word TOWER : " <<ct ;

}
```

- b) Write a definition for function COSTLY() in C++ to read records of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below: 3

```
class GIFTS
{
  int CODE; char ITEM[20] ; float PRICE;
public:
  void Procure( )
  { cin>>CODE ; gets(ITEM) ; cin>>PRICE ; }
  void View( )
  { cout<<CODE<<": "<<ITEM<<": "<<PRICE<<endl; }
  float GetPrice( ) { return PRICE; }
};
```

Answer:

Function heading - ½ mark

Correct Program logic – 2 ½ marks

- c) Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members: 2

```
class MEMBER
{
  int Mno ; char Name[20];
public:
  void In( ) ; void Out( ) ;
```

```

    };

void main()
{
    fstream MF;
    MF.open("MEMBER.DAT", ios::binary|ios::in);
    MEMBER M;
    MF.read((char*)&M, sizeof(M));
    MF.read((char*)&M, sizeof(M));
    MF.read((char*)&M, sizeof(M));
    int POSITION = MF.tellg() / sizeof(M);
    cout<< "SIZE OF ONE RECORD="<< sizeof(M);
    cout<< "PRESENT RECORD:"<< POSITION<< endl;
    MF.close();
}

```

Answer: (1 mark each)

SIZE OF ONE RECORD = 22PRESENT RECORD : 3

8. Find and write the output of the following C++ program code:

2

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

```

void main()
{
    char *Text = "ELLORA";
    int *P, NUM [ ] = { 10,15,18,45 }
    P = NUM;
    cout<< *P << Text << endl;
    Text++;
    P++;
    cout<< *P << Text << endl;
}

```

Answer: (1 mark each)

10ELLORA

15LLORA

9. a) An array T[25][30] is stored in the memory along the row with each of the element occupying 2 bytes, find out the base address and address of element T[10][15], if an element T[5][10] is stored at the memory location 25000.

3

Answer: (Formula ½ mark, substitution of values to the variables in the formula- ½ mark,
Correct Base address- ½ mark, Correct address of T[5][10] 1 ½ mark)

Address [I,J] = B + W (C* (I - Lr) + (J - Lc))

B = 24680

Address of T[10][15] = 25310

- b) Write a function to sort any array of n elements using exchange selection sort . Array and its size should be passed as argument to the function.

3

Answer:

Function heading - ½ mark

Correct Program logic – 2 ½ marks

- c) Write a definition of a function Reverse(int A[],int N) in C++,which should reverse the entire content of the array A having N elements, without using any other array. 2
Example: if the array A contains

10	20	35	47	53
----	----	----	----	----

Then the array should become

53	47	35	20	10
----	----	----	----	----

Answer:

Function heading – ½ mark

Correct program logic – 1 ½ marks

- d) Write a definition for a function ADDMIDROW(int MAT[][10], int R, int C) in C++, which finds the sum of the middle row elements of the MAT (Assuming C represents number of columns and R represents number of rows, which is an odd integer). 2
Example: if the content of array MAT having R as 3 and C as 5 is as follows:

1	2	3	4	5
2	1	3	4	5
3	4	1	2	5

The function should calculate the sum and display the following:

Sum of Middle Row: 15

Answer:

Function heading – ½ mark

Correct program logic – 1 ½ marks

- 10.a) Write the definition of a member function POP() for a class BOOKSTORE in C++ to insert a book information in a dynamically allocated stack of books considering the following code is already written as a part of the program: 3

```
struct BOOK
{ int bookid;
  char bookname[20];
  BOOK *next;
};
```

```
class BOOKSTORE
{ BOOK *top;
public:
  BOOKSTORE( )
  { top = NULL; }
  void PUSH( );
  void POP ( );
  ~BOOKSTORE( );
};
```

Answer:

Correct function heading and variable declarations – 1 mark

Correct program logic – 2 marks)

- b) Write the definition of a member function INSERT() for a class QUEUE in C++, to insert an item to a dynamically allocated Queue of items considering the following code is already written as a part of the program. 3

```
struct ITEM
{
    int ID;
    char INAME[20];
    ITEM *Next;
};
class QUEUE
{
    ITEM *R,*F;
public:
    QUEUE(){ R=NULL; F=NULL; }
    void INSERT();
    void DELETE();
    ~QUEUE();
};
```

Answer:

Correct function heading and variable declarations– 1 mark

Correct program logic – 2 marks)

- c) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. 2

P + (Q - R) * S / T

Answer: (Have to show the correct stack status after each step till the final answer)

PQR – S * T / +

- 11.a) Define i) Primary Key ii) Alternate Key 1

Answer: (½ mark each)

i) A primary key is a set of one or more attributes that can uniquely identify tuples in a relation.

ii) A candidate key that is not a primary key is called an alternate key.

- b) What do you mean by selection operation and projection operation in Relational Algebra. 2

Answer: (1 mark each)

A selection operation selects tuples from a relation that satisfies a given predicate. It is denoted by the lowercase Greek letter sigma.

The projection operation yields a vertical subset of a given relation. It allows you to select specified attributes in a specified order. It is denoted by Greek Letter pi

- c) Differentiate between Cardinality and Degree. Explain with the help of an example. 2

Answer: (1 mark each)

Cardinality is the total number of tuples present in a relation.

Degree is the total number of attribute present in a relation

12. Write SQL commands for the queries (i) to (viii) and output for (ix) to (xii) based on the tables 'SUPPLIERS' and 'PRODUCTS' as given below.

Table: SUPPLIERS

SUPCODE	SNAME	CITY
S01	GET ALL INC	KOLKATA
S03	EASY MARKET CORP	DELHI
S02	DIGI BUSY GROUP	CHENNAI

Table: PRODUCTS

PID	PNAME	QTY	PRICE	COMPANY	SUPCODE
101	DIGI CAMERA	120	12000	RENIX	S01
102	DIGI PAD	100	22000	DIGI POP	S02
104	PEN DRIVE	500	1100	STOREKING	S01
106	LED SCREEN	70	28000	DISPEX	S02
105	CAR GPS	60	12000	MOVEON	S03

- i) To display all the details of all the products in the ascending order of product names. 1
- ii) To display product name and price of all those products, whose price is in the range of 10000-15000 (both inclusive). 1
- iii) To display the number of products, which are supplied by each supcode. 1
- iv) To display the price, product name and quantity of those products which have quantity more than 120. 1
- v) To display all the names of those suppliers, who are either from DELHI or from CHENNAI. 1
- vi) To display the product names starting with the letter 'D'. 1
- vii) To display the average price of a product. 1
- viii) To display all the details of suppliers not from KOLKATA. 1

Obtain the output of the following SQL queries (ix to xii) based on the data given in tables PRODUCT and SUPPLIERS above. 2

- ix) SELECT DISTINCT SUPCODE FROM PRODUCTS ;
- x) SELECT MAX(PRICE), MIN(PRICE) FROM PRODUCTS ;
- xi) SELECT PRICE * QTY FROM PRODUCTS WHERE PID = 104 ;
- xii) SELECT PNAME, SNAME FROM PRODUCTS P, SUPPLIERS S
WHERE P.SUPCODE = S.SUPCODE AND QTY > 100 ;

Answer: (1 mark each, No mark for partial correct answers)

- i) SELECT * FROM PRODUCTS ORDER BY PNAME ASC ;
- ii) SELECT PNAME, PRICE FROM PRODUCTS WHERE PRICE BETWEEN 10000
AND 15000 ;
- iii) SELECT SUPCODE, COUNT(*) FROM PRODUCTS GROUP BY SUPCODE ;
- iv) SELECT PRICE, PNAME, QTY FROM PRODUCTS WHERE QTY > 120 ;
- v) SELECT SNAME FROM SUPPLIERS WHERE CITY IN("DELHI", "CHENNAI") ;
- vi) SELECT PNAME FROM PRODUCTS WHERE PNAME LIKE "D%" ;
- vii) SELECT AVG(PRICE) FROM PRODUCTS ;
- viii) SELECT * FROM SUPPLIERS WHERE CITY <> "KOLKATA" ;

Answers : (½ mark each)

- ix. DISTINCT SUPCODE
S01
S02
S03
- x. MAX(PRICE) MIN(PRICE)
28000 1100
- xi. PRICE * QTY
550000
- xii. PNAME SNAME
PENDRIVE GET ALL INC
DIGI CAMERA GET ALL INC

End of the Question Paper